GAS JOURNAL, OCT. 18, 1939

VOL. 229 91st YEAR No. 3987

# Editorial Notes

## Best Use of Coal

IN the "JOURNAL" of October 4 we said that rationing of gas is a problem regarding which decision cannot be taken as though it was a straightforward issue of economy at the gas burner; and we put forward the view that it must be in the best interest of the nation that coal should be used wisely and that the valuable products it contains and will yield on carbonization should be put to good use. That, we suggested, is true national economy, as contrasted with the burning of raw coal in the domestic hearth, which practice must be regarded now more than ever as national waste. We are by no means alone in this opinion. Mr. S. W. Alexander, City Editor of the *Daily Express*, writing in that paper last week, went so far as to say that the demand for by-products makes gas rationing impossible; and it does seem somewhat absurd to set a limit to the use of gas when the country is in need of benzole and toluole, the chemicals derivable from tar, and sulphate of ammonia for agriculture.

"Do not forget," observed Mr. Alexander, "that in wartime the Gas Industry is more important than ever." It is unfortunate that so many people do forget this fact—that the process which the Industry operates is fundamentally the best way of conserving the national resources, that the use of gas and coke should be encouraged rather than restricted. And in this matter of coal conservation it is pertinent to consider broadly the relationship of gas and electricity for heating. For domestic and most industrial heating purposes gas is more economical of coal than electricity even when the latter is generated at the best efficiencies at present obtained. Let us at the present juncture, however, have regard to the actual average conditions throughout the country. From the Electricity Commissioners' Report for 1937-38 we find that 1,571 units of electricity were generated per ton of coal burned. This is equivalent to 53.6 therms. If we assume the average calorific value of the coal used to be only 11,500 B.Th.U. per lb., this means that a ton contains 258 therms. Therefore the efficiency of electricity generation was 20.8%.

Now let us turn to the Board of Trade Return for authorized gas undertakings. From the figures set out therein—they relate to the year 1937—we find that the amount of gas made per ton of coal carbonized was 16,450 cu.ft., which, at a calorific value of 480 B.Th.U. per cu.ft., represents 79 therms. The coke made per ton of coal is given as 13.42 cwt., and 0.5 cwt. per ton was used in the production of water gas. Let us take it that one-third of the coke made was used as fuel for the carbonizing process. Then we have 8.5 cwt. for sale, and at 12,000 B.Th.U. per lb. this is equivalent to 114 therms. The tar produced amounted to 12.7 gallons per ton of coal, which represents 20 therms. Thus, from one ton of coal at nearly 13,000 B.Th.U. per lb.—300 therms—213 therms are recovered by the Gas Industry in the form of gas, coke, and tar. The gas represents 26.3%, the coke 38%, and the tar 6.6% of the original energy in the coal.

Now if the loss is charged to gas, then with 26.3 heat units as gas and 29.1 heat units lost in generation, the efficiency of gas-making works out at 47.5%. Let us compare this with the 20.8% efficiency of electricity generation. We see that the generation of one unit of electricity represents an expenditure of 2.3 times as much coal as the generation of an equivalent heat content in the form of gas. It may be taken that the losses in distribution are 10% greater for electricity than for gas. In round figures the loss in electricity is 15% and the loss in gas distribution is 5%. In other words, a unit of electricity distributed represents an expenditure of 2.6 times as much coal.

We can now take these calculations a step further and consider the utilization of gas and electricity for domestic heating. Mr. C. A. Masterman, in his Communication on "Gas Appliance Design" to The Institution of Gas Engineers in 1937, gave a thermal efficiency of 50% for gas used for domestic heating and a thermal efficiency of 74% for electricity used for the same purpose. Then one unit of electricity usefully employed for domestic heating represents the expenditure of over 1.7 times as much coal as is required for a unit of gas usefully employed. Such calculations as we have made, and the arguments we have advanced, show unmistakably how for heating purposes the national interest is best served by employing the products of the Gas Industry. If the object of the Fuel and Lighting Order is to conserve coal, it stands out clearly that gas should be used for cooking and heating purposes in preference to electricity.

# Coke Oven Gas Rationing

THERE is another aspect of gas rationing and the operation of the Fuel and Lighting Order which calls for comment. In this regard there was an announcement in last week's "JOURNAL" that the Ministry of Mines had decided to exempt coke oven gas supplies. Subsequent information, however, indicates that an application for exemption on these grounds by the Middlesbrough Corporation has been met with a reply from the Ministry to the effect that "it is not considered desirable to exempt districts using coke oven gas."

This reply, taken out of its context, is, however, rather misleading. It must not, we imagine, be regarded as a categorical refusal of this specific application so much as a general statement of policy as regards the Ministry's attitude towards wholesale exemption from the Fuel and Lighting Order. In point of fact, just as in the case of private consumers, application for exemption has to be made to the local fuel overseer, with whom rests the final decision. We do not know what influenced the decision in this particular instance—if, indeed, decision it be—or whether it is to be regarded as final; but the arguments in favour of exemption in such areas are so overwhelming as to make it difficult to see any justification whatever in a decision which must inevitably lead to the deliberate waste of a valuable fuel. Waste at any time is to be deplored—but in war-time a thousand times more so.

The position as reported in Consett and Jarrow, where more gas is being produced at the coke ovens than can possibly be absorbed by local supply undertakings, is probably typical of many other districts. The public lighting restrictions have already provided sufficient cause for a drop in consumption which renders it impossible for gas undertakings to take their normal coke oven gas supplies. Indeed, a decrease in consumption of as much as 30% in one Tyneside area has been attributed to this load alone—apart from any domestic and commercial rationing that may follow. Thus the output as a whole has already been "rationed" more drastically than any official scheme. It is not easy, moreover, to visualize the difficulties which an adverse decision may impose on producers whose outlet for coke oven gas is thus ruthlessly curtailed. No alternative appears to lie open to them than to burn it to waste—and presumably even this cannot be done during black-out hours as the flares would illuminate the whole countryside.

The response to the recent appeal for exemption by the Newcastle-upon-Tyne and Gateshead Gas Company and others will be awaited with interest. Mr. T. P. Ridley rightly observes that the rationing of gas in such an area as Tyneside is quite unnecessary, for Durham is one of the largest coke-producing districts in the country, and with the present increased demand for metallurgical coke it is unavoidable that considerable quantities of gas will have to be blown to waste. A representative of a large Durham colliery, while not quarrelling with the principle of rationing, is reported to have gone so far as to characterize the rationing of coke oven gas at this stage as "sheer stupidity."

It should be emphasized that such rationing can lead to no conservation of our coal resources; for we are not considering a primary product, and coke oven owners have been asked to maintain, and so far as practicable increase, their output of foundry coke, benzole, tar, antiseptics, &c.—all of which are vitally necessary in times like these. As we suggested last week, therefore, it is surely better to permit existing consumers to make full use of such gas as is available—pending its diversion into any more useful channels that may be found—rather than allow it to be blown to waste. The resentment which has been expressed at Kettering against the rationing scheme can be well understood. The town takes its supply from the coke ovens at Corby, and even in normal times a certain amount of the gas produced cannot be absorbed by the Kettering Gas Company. Now, consumers are having to reduce their consumption in order that still more gas may be blown to waste—without saving one ounce of coal. In other words, consumers are being forced to economize so that the gas they so carefully save can be wasted.

It is unthinkable that local fuel overseers will lightly dismiss any application for exemption of coke oven gas supplies. It is, above all, unthinkable that they will be influenced in their decision by any consideration such as not wishing to favour consumers of coke oven gas as compared with other gas consumers. War is war, and such inequalities must be regarded as what golfers call a "rub of the green." It might as well be argued that if derationing of gas was eventually deemed to be in the best National interests it would not be introduced because it would be hard on the electricity industry. In war all such rivalries must surely give way to the common cause, and we believe the electricity industry would be the last to put forward any such claim.

# Single-Stage Gasification

MUCH useful data are to be found in the Paper by Mr. Robert Fife to the North British Association of Gas Managers, which we published in the "JOURNAL" last week. The subject of his contribution was the single stage process of complete gasification, and the information set out concerned the operation of two plants of uncommon design built by a Kilmarnock engineering firm—one a generator of 700,000 cu.ft. per day, the other of a capacity of 150,000 cu.ft. The latter proved the most satisfactory, the Author putting forward the view that the larger plant was "beyond the workable limit" and concluding that there must be a limit in size, somewhere between the two plants of the type described, beyond which it is unwise to go.

Actually the results given by Mr. Fife were not of complete gasification but of partial gasification, which is quite a different matter. In one of the trial runs recorded the coke extracted per ton of coal charged to the plant was 8 cwt.; in the other it was 5½ cwt. The makes of therms per ton of coal were respectively 105 and 121, and the calorific values of the gas produced were 414 B.Th.U. and 383 B.Th.U. The economies of the process would obviously have been very different when operating on a complete gasification cycle, for in a comparison with vertical retorts making 380 B.Th.U. gas (which involves partial gasification) it is the revenue from coke from the internally heated plant which brings the net cost of coal per therm, at 1.25d., to the same figure which applies to the operation of the vertical retorts. In considering fuel costs the Author did draw attention to the fact that the cost of gas oil required to enrich one therm (303 cu.ft. of 330 B.Th.U. gas which he obtained on a complete gasification test to 380 B.Th.U. quality) of complete gasification gas would amount to about 1d. The point was brought out once again quite clearly in the Paper that, though large volumes of gas per ton of coal can be produced by the complete gasification process, without the sale of coke the cost per therm rises, and that if this gas requires to be enriched with oil the cost per therm again soars.

In Scotland only eight undertakings use complete gasification as the sole process of gas manufacture, representing a total output of 130 million cu.ft. per annum, which is only 0.4% of the total gas output in Scotland. One need not go far to find the reasons—the lack of revenue from coke resulting in an expensive therm into holder, and the reduced carrying capacity of the distribution system when supplying gas of a low calorific value. The comparison of the operation of partial gasification and of vertical retorts making gas of the same calorific value, as given by Mr. Fife, is, however, singularly interesting. Considering the low inert content of the 380 B.Th.U. gas produced by partial gasification, and also the consistency of this quality, the Author put forward the opinion that it would provide an excellent town gas to which any modern gas appliance could be adapted. His impression on the operation of the partial gasification plant described, as compared with horizontal or vertical retorts, or even with a water gas generator, is that it requires more constant and careful attention from the operator. The consistency of the results obtained, he pointed out, were no doubt in a great

measure accounted for by the excellence of the construction and also the soundness of the controlling factors associated with the operation of the plant; but he submitted that "a single-stage unit of this type would be more useful and economical in producing town gas than any two-stage process, such as complete gasification used as an auxiliary to horizontal retorts." As we announced in the "JOURNAL" last week, though the meeting of the North British Association at which the Paper was to have been presented had to be cancelled owing to the outbreak of war, discussion on the contribution is invited. Those taking part in the discussion should address their observations in writing to the Author. Subsequently these, together with the Author's reply, will be published in the "JOURNAL." We feel sure that there will be a good response to this invitation; the nature of Mr. Fife's Paper certainly merits such a response.

## Progress at Perth

THE other Paper which was to have been presented at the meeting of the North British Association was by Mr. A. C. Rea, and this we publish to-day. In it the Author described the efforts he put forward during the past three years—and it will be generally agreed with conspicuous success—to place the Perth Gas Undertaking in a satisfactory position to meet all demands and to give a first rate gas service. These efforts covered all sections of the undertaking's activities—works, district, and sales organization, and Mr. Rea can justifiably be proud of a modern and exceedingly well equipped works—equipped for wartime needs. He has new carbonizing plant consisting of Glover-West continuous vertical retorts; these were brought into operation only this year and embody a new heating system which is fully described in the Paper and which shows such efficiency that a fuel consumption of a little over 10% has been obtained.

The figures and particulars given by Mr. Rea regarding the operation of the benzole plant installed at Perth are full of interest, and the financial statement is significant. Even with partial recovery he has been able to show a handsome profit on the process, and he has experienced no serious difficulty in disposing of the extra coke made. The reason for this lies in his policy of cultivating the market and starting at the right end by marketing a good quality product. The Paper was prepared prior to the outbreak of war, but even so he stated that his policy in regard to benzole then, after his peace-time experience of recovery, was to extract the maximum quantity practicable. Apart from making a substantial net revenue on benzole, however, Mr. Rea has reaped an ancillary advantage, the importance of which we have emphasized many times in these columns, and that is the contingent drop in sulphur content of the gas when washing from benzole. Scottish coals, it is true, are relatively low in sulphur, but the reduction at Perth from 12 to 7 grains per 100 cu.ft. is an excellent step which will mean that consumers can in this time of enforced economy use gas fluelessly for domestic heating without discomfort. The same element of comfort and satisfaction applies also, of course, to shop heating, for which purpose flueless appliances constitute the cheapest form of central heating.

## Personal

Retford Town Council have agreed to the appointment of Mr. R. G. CHEESEWRIGHT as Acting Manager of the Gas and Water Department in the absence of Mr. Oswald Pacey, who is on military service.

* * *

Mr. K. L. PEARCE, hitherto Engineer and Works Manager of the Bilston Gas Light and Coke Company, has been appointed to the position of Engineer and Manager, while Mr. R. THOMPSON, previously Secretary to the Ashton and Mossley and Saddleworth Gas Companies, has been appointed Secretary in succession to Mr. A. BRADFORD LEGG, who has retired after 53½ years' service with the Bilston Company. Mr. F. HARVEY, of the Loughborough Gas Department, has been appointed Deputy Engineer and Manager at Bilston.

* * *

Mr. E. F. DADSON, until recently Director and General Manager of the Antwerp Gas Company, has been appointed General Manager of the Imperial Continental Gas Association as from Oct. 1.

* * *

Mr. J. GILES, Manager of the Sandwich Corporation Gas-Works, has decided to retire next March, in spite of a request by the Gas Committee that he should remain in office for another year in view of the present situation. The Committee have expressed their appreciation of his services.

Mr. A. F. OATLEY has been appointed Sales Manager to the Cannon Iron Foundries, Ltd., Gas Stove Department, at Deepfields, Bilston. Prior to taking up his new post, Mr. Oatley was Superintendent of Gas Sales to the United Kingdom Gas Corporation. His other administrative positions include Northern Sales Manager of Searsint, Ltd. (Sears Roebuck, U.S.A.), and General Sales Manager of W. Gestetner (Canada), Ltd.

* * *

Under the Order in Council dated Feb. 6, 1928, the Lord President of the Council has appointed Sir Joseph Barcroft, C.B.E., M.D., D.Sc., F.R.S., Sir Harold B. Hartley, C.B.E., M.C., D.Sc., F.R.S., and Sir Frank E. Smith, G.B.E., K.C.B., D.Sc., LL.D., F.R.S., to be members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research. The Rt. Hon. Lord Cadman of Silverdale, G.C.M.G., D.Sc., LL.D., and Sir James Jeans, O.M., D.Sc., LL.D., F.R.S., have retired from the Council on completion of their terms of office.

* * *

Mr. J. WATSON NAPIER, B.Sc., M.I.Chem.E., recently resigned his position as Chemical Engineer with Newton Chambers & Co., Ltd., to take up an appointment as Works Manager to Nitrogen Fertilisers, Ltd., Flixborough, near Scunthorpe, at their new synthetic ammonia and fertilizer works there.

## Obituary

Mr. EASTON LEE, who until his retirement in June, 1937, was display expert to the Newcastle-upon-Tyne and Gateshead Gas Company, died on Oct. 8. He will be remembered as a regular contributor to the columns of the "GAS SALESMAN."

* * *

The funeral of Mr. S. E. HALLIWELL, Secretary and Commercial Manager of the Bristol Gas Company for 22 years—whose death was announced in the "JOURNAL" last week—took place privately at the Arno's Vale Crematorium. A memorial service later at St. James's Church, Bristol, was largely attended. In a brief address, the Rev. D. A. Jaquet referred to the business integrity of Mr. Halliwell and earnest enthusiasm with which he built up his life's work. His friendship and cheerful disposition had won him many friends, and with the example he had set he would be very much missed.

Among those present at the memorial service were about a hundred members of the Bristol Gas Company's staff, including Mr. G. H. Boucher (Chairman), Sir Francis N. Cowlin (Director), Mr. F. C. Burgess (Director), Mr. Robert Robertson (Engineer and Works Manager), Mr. G. H. Palmer (Assistant Secretary), Mr. Noel S. Smith (Distribution Engineer and Sales Manager), Mr. W. J. Baker (Deputy Engineer and Works Manager), Mr. W. D. Rowe (Manager of the B.C.G.A.), who also represented other national bodies, Mr. J. Wesley Whimster (Engineer and Manager of the Bath Gas Company), who also represented The Institution of Gas Engineers, Mr. T. Sargeant (representing the S.B.G.I.), Mr. W. N. Westlake (Exeter), Mr. J. Taylor and Mr. J. F. Marlow (Weston-super-Mare), Mr. W. Blundell (Bath), Mr. T. H. Woodcock (Stroud), together with representatives of many other local trades and industries.

* * *

The death occurred on Oct. 4 of Mr. PETER BLACKHALL, who had been for the past seventeen years representative in Scotland for Messrs. Alder & Mackay, Ltd., meter manufacturers, of Edinburgh. He was 41 years of age. The following appreciation has been sent us:

The mortal remains of Mr. Peter Blackhall were cremated in Edinburgh on Sunday, Oct. 8. The memorial service held in the beautiful chapel at Goldenacre Cemetery was attended by over 200 mourners, including the Chairman and Directors of the firm of Alder and Mackay, a large number of representatives of kindred trading firms and over thirty Gas Engineers from all parts of the country, including Mr. H. A. Aitken (President of the North British Association of Gas Managers), Mr. James Jamieson and Mr. Duncan Melvin (Edinburgh), and Mr. J. Hunter Rioch (Cambridge).

Mr. Blackhall had not been well for the past three years, but his illness took a sudden turn for the worse towards the middle of August and his strength gradually waned until death occurred in an Edinburgh Nursing Home on the evening of Oct. 4.

Peter Blackhall, affectionately known as "Peter" throughout the length and breadth of Scotland, joined the firm of Alder & Mackay in 1912 on completion of his school career, and excepting for a period of about two years with the R.A.F. during the Great War spent his whole business career with that firm. He early showed distinct ability, and his keenness to know all the details of gas meter manufacture marked him out for promotion. It was in a moment of inspiration that in 1922 the Directors decided to appoint him Sales Representative in Scotland, for in that position he was a success from the very outset.

Character was implicit in every atom of his being, and it is difficult to speak too highly of his sincerity, his generous and unselfish nature, his friendly yet not inquisitive interest in all the doings of his friends, and his unalloyed pleasure when any of them met with a little success. He had the large charity which finds nothing to criticize, but much to praise, and he gave of himself freely counting nothing trouble if only he could be helpful.

No reference would be complete without mention of his keen attachment to the game of golf. Just as in business he spared no effort to do a good job so equally wholeheartedly he devoted himself to his recreation and reaching a single figure handicap he was a doughty opponent. But he had the true instinct of the sportsman, for victory meant nothing to him if his opponent had failed to do himself justice. Then the pressing problem became the finding of a cure for the golfing faults of his friend, and the "true swing" would be expounded and demonstrated tirelessly. To many it must be a real regret that pleasant days on the links with him will come no more.

He leaves fragrant memories—for to know him was to be his friend; and all in the Gas Industry in Scotland and beyond will feel much sympathy for his young widow and son and with the firm which has lost a faithful servant.

D. F.

* * *

The death has occurred at his residence, Hillbrook Grange, Bramhall, Stockport, of Sir THOMAS ROWBOTHAM, at the age of 88. Sir Thomas was elected chairman of the Stockport Gas Committee in 1920, and remained in office until his retirement from the Council last year.

# Letters to the Editor

## Rationing of Gas and Coal

SIR,—The Fuel and Lighting Order has been censured in your columns as being ambiguous in its provisions, clumsy in operation, difficult to administer, and, on account of its failure to differentiate between efficient and inefficient methods of using coal, inappropriate to the end in view.

These charges are beyond denial, but it is possible to go even further and state that the Order is not merely a confusing, costly, and inappropriate measure, but may result not in the conservation, but in a greater wastage of coal.

The reason is evident. Few coal merchants keep records of their cash retail sales to industrial consumers, and most domestic consumers have hazy notions of their quarterly coal consumption. Deciding basic quantities will be largely guesswork, with the consumption during the standard year guessed generously high; domestic consumers are likely to be able to secure all the coal they require. Contrast the position of gas. In the meter readings there is a true record of the consumption of each premises during the standard year, and, the ration being fixed as a proportion of that consumption, a definite allowance against which the consumer's actual consumption can be checked. The only fuel rationing which is likely to operate in practice is the rationing of heat supplied *through a meter*—that is, principally, gas. Thus we reach the paradoxical result that the provisions of the Fuel and Lighting Order are likely to encourage the use of raw coal at the expense of gas—the inefficient way displacing the efficient method—and, therefore, contribute to the wastage of our coal resources, rather than to their conservation.

If an adequate case had not already been made on other grounds, it would surely be conclusive evidence for the withdrawal of gas rationing, that the present Fuel and Lighting Order is likely, in practice, to defeat its own purpose.

Incidentally, I calculate that even if gas rationing worked "according to plan," and all ordinary meter consumers, except the large industrial users, reduced their consumption by 25%, the net coal saving would not be much more than one million tons. The same economy—forgetting all about by-products—would be achieved if no more than 5% of the coal now burnt were replaced by gas heat, giving a better service to the consumer. Which is an inspiring thought for the Gas Industry, and one which should come into the calculations of those in authority, planning the conservation of coal.

Yours, &c.,
PHILIP CHANTLER.

Manchester,
*Oct.* 14, 1939.

## Keeping the Industry Intact

SIR,—We have read with interest the Editorial Notes headed "Keep the Industry Intact" in the current issue of the "GAS JOURNAL," and certainly agree with the remarks stated.

We ourselves are, of course, principally known in our long association with the Gas Industry as manufacturers of cooking and food service equipment for large-scale catering establishments, but we do also handle a considerable amount of special and repetition metal work and other apparatus.

We should be only too pleased to fit in with any arrangements for co-operation and interchange of business within the framework of the Gas Industry, and shall be pleased to quote for any requirements of the other Gas Industry suppliers at any time.

We are, at the moment, fully engaged ourselves on Government contract work, but we have new additional works in course of erection when we shall be able to handle a much greater volume of business.

Meanwhile, as already stated, we shall be pleased to co-operate in any way possible with other manufacturing firms.

Yours, &c.,
HENRY A. LESTER.

Bartletts, Bell Street,
London, N.W.1.
*Oct.* 12, 1939.

## Importance of Maintaining Advertising

SIR,—Much has been written since Sept. 3 stressing the necessity for British Trading and Industrial concerns to continue their advertising during the war. With a view to retaining goodwill and prominence for our product, Saunders Valves, and incidentally minimizing unemployment in the printing and allied industries, we are in fact *extending* our advertising to markets not yet adequately covered, both "home" and overseas.

We think it is in the National interest that all firms in a position to do so should maintain progressive advertising policies.

Yours, &c.,
A. H. P. KILCOIN,
Sales Manager.

SAUNDERS VALVE COMPANY, LTD.
*Newport, Mon.*,
*Oct.* 12, 1939.

# Forthcoming Engagements

**Oct.**

**20.—Manchester Association.**—General Meeting, Midland Hotel, Manchester.

**26.—S.B.G.I.**—Meeting of Emergency Committee, Banbury, 2 p.m.

**26.—Wales and Mon. Association.**—Annual Meeting at Cardiff.

**27.—Coke Oven Managers' Association.**—Annual Meeting, Royal Station Hotel, York, 11.45 a.m.

**Nov.**

**14.—N.G.C.**—Central Executive Board Meeting, 11 a.m.

## Eastern Counties Association

Owing to the outbreak of hostilities the Autumn Meeting of the Eastern Counties Gas Engineers' and Managers' Association, which was to have been held at Sudbury, is cancelled.

# News of the Week

**The Midland Counties Coke Association** have moved into new offices in King Edward House, 135, New Street, Birmingham, 2. 'Phone: Midland 1186 and 5287. Telegrams: "Midgascoke."

**A Pact of "Non-Aggression"** has been reached between the Fleetwood Corporation Electricity Department and the Fleetwood Gas Company. Each have agreed that they will not canvass customers of the other for the duration of the war. They will also do their best to discourage householders from changing over from one service to the other. Economy is the principal object.

**Application Has Been Made** to the Ministry of Health by the Ennerdale (Cumberland) Rural District Council for sanction to borrow £14,542 for work in connexion with a bulk supply of gas for that area from Workington. The money will be divided between the Stanton Ironworks Co., Ltd., who are to supply spun iron pipes, and the Border Engineering Contracts, Ltd., who will lay the mains.

**Contributions to Local Charities** amounting to £203 11s. 6d. have been made during the past year by employees of Messrs. Alder & Mackay, Ltd. This sum has been disbursed between the Edinburgh Royal Infirmary, the Royal Hospital for Sick Children, and the Queen's Institute of District Nursing. Though the amount is slightly smaller than usual, due to indifferent trading conditions, these generous contributions will be more than usually welcome in view of the war-time demands on these institutions.

**To Supply Compressed Coal Gas** the Wallasey Gas Committee have applied to the Board of Trade for an appropriate grant to meet expenditure estimated at £3,500 for an extension of their compressing plant.

**No Rationing of Gas** to consumers at Mansfield, Notts, is likely to be imposed as since 1935 a bulk supply of gas for the town and district has been taken through a ten-mile long 12 in. main from the coke ovens at the Grassmoor Colliery.

**The Hire-Purchase Policy** of the Bury Gas Department is to be altered to meet present circumstances. In future the initial deposits are to be trebled and the hire-purchase periods halved, with corresponding modifications in the instalment rates.

**A General Failure** of the electricity supply occurred in Dundee on Oct. 9 between 5 and 6 p.m. The tram service stopped, cinemas were affected, and patrons sat in the dark until the current was restored. It was almost 20 minutes before the supply throughout the city was resumed.

**The B.C.G.A. Film Library** has resumed operations. Orders for films should be sent as usual to the Film Officer. It is advisable in view of the uncertainty of transport by rail and post that as much notice as possible should be given when a film is required. A further announcement regarding the availability of new films will be made shortly.

## Manchester District Association

### Programme for General Meeting

As previously announced in the "JOURNAL," an Ordinary General Meeting of the Manchester District Association of Gas Engineers will be held at the Midland Hotel, Manchester, on Friday, Oct. 20, prior to which there will be a luncheon at 12.30 p.m., when the presentation of Certificates to successful candidates in the Examinations of The Institution of Gas Engineers will be made.

The business meeting will commence at 2 p.m. under the Presidency of Mr. H. Singleton (Engineer and Manager of the Huddersfield Corporation Gas Department), and a Paper will be presented by Mr. Norman Hudson (Engineer, Manager, and Secretary of the Mirfield Gas Company) entitled "Total Sulphur Below 10 Grains per 100 cu.ft.—The Practice and Results on a 140 Million Works with the Oil-Washing Process." This will be followed by a discussion.

## National Service

### Central Register

Gas Engineers who have enrolled, through The Institution of Gas Engineers, on the Central Register of the Ministry of Labour, are particularly requested to notify any change of address without delay to the Secretary of The Institution of Gas Engineers.

Owing to war-time conditions, some Gas Engineers, whether on the supply or contracting sides of the Industry, may find themselves free to take up an appointment immediately. They are requested, in such case, to communicate with the Secretary of The Institution of Gas Engineers, or with the Secretary of the Society of British Gas Industries, "Uplands," Epsom Road, Guildford, Surrey.

## Fuel Luncheon Club

At the last meeting of the Fuel Luncheon Club Committee, held on Oct. 4, it was unanimously decided that every effort should be made for the carrying on of the Club's activities during the present crisis on the same lines as previously.

In view of the present circumstances, it was agreed that until such time as hostilities should cease a cordial welcome will be extended to all members of those Institutions who are eligible for membership of the Club to attend the monthly luncheons if they so desired, and it was decided that the cost to them would be the price of the lunch, plus an additional 1s. to cover overhead expenses.

Owing to the fact that the Connaught Rooms had had to raise the price of the lunch to 5s., this would make the charge to such visitors 6s. per head (exclusive of gratuities and liquid refreshment) for each luncheon.

Any such visitor wishing to be present at any of these luncheons is asked to forward his remittance of 6s. to the Secretary of the Club, when a ticket will be sent to him.

## Wales and Monmouthshire Association

### Programme for General Meeting

The following programme has been arranged for the General Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers, which, as already announced in these columns, will be held on Thursday, Oct. 26, in the Lecture Theatre, South Wales Institute of Engineers, Park Place, Cardiff.

Mr. J. H. Canning, O.B.E., J.P., will take the chair at 11 a.m., and the general business of the meeting will include the introduction of the President-Elect, Mr. J. Prosser Jones, consideration of a report relative to the Octavius Thomas Memorial Fund. Certificates, and the presentation of prizes to members of the Wales and Monmouthshire Junior Gas Association.

A paper, entitled "Unaccounted-for Gas," will be given by Mr. C. B. Felton (Engineer, Manager, and Secretary of the Ludlow Union Gas Company), which will be followed by a discussion. This Paper was published in the "JOURNAL" for Sept. 27. The meeting will adjourn at 1 p.m. for luncheon at the Park Hotel, Cardiff. No Golf Meeting is being arranged on this occasion.

## Institution of Chemical Engineers

### Associate-Membership Examination

The Associate-Membership Examination of the Institution of Chemical Engineers for 1940 will be held at the normal time and on the usual lines, as follows:

*Home Paper:* Mid-January to April 1.

*London Papers:* May 2, 3, and 4.

The closing date for entries will be Wednesday, Dec. 20, 1939.

Copies of past examination papers may be obtained from the offices of the Institution at the price of 1s. per set. Papers are available back to the first examination, held in 1936.

## War-Time Changes of Address

In addition to the lists published in previous issues we have been notified of the following changes of address:

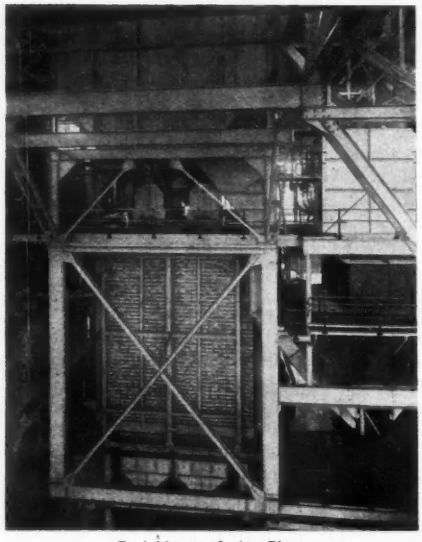
Primitiva Gas Company of Buenos Aires, Ltd., "Cloverley," Park Hill, Loughton, Essex.

National Benzole Co., Ltd., Stonor Park, Stonor, Henley-on-Thames. 'Phone: Turville Heath 303/4.

Tar Residuals, Ltd., "Garthlands," Reigate Heath, Reigate, Surrey. 'Phone: Reigate 2251/2. This above relates to the following companies: Tar Residuals, Ltd., Walter Waugh & Co., Ltd., Simon Carves, Ltd., Pitch Marketing Co., Ltd., Creosote Producers Association, Ltd., Imatex, Ltd., Immingham Storage Co., Ltd.

# Extension to Carbonizing Plant at Stockport

**Owing to the national emergency, the official opening of the extension to the carbonizing plant at the Portwood Gas-Works, Stockport, which was to have taken place on Sept. 22, was cancelled, and the plant was put into operation without ceremony.**



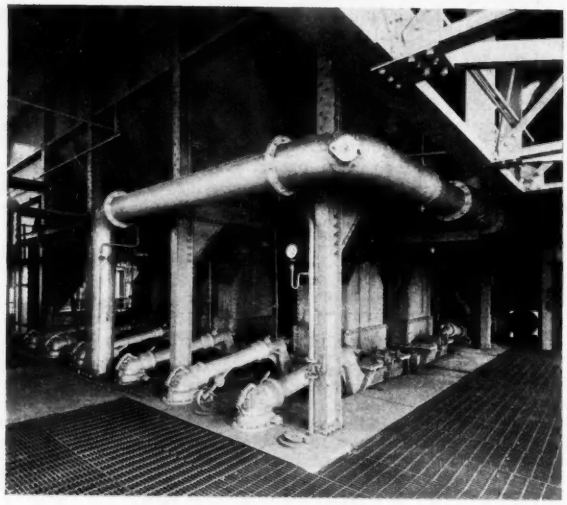
End View of the Plant

THE new plant consists of one bench of twelve 82 in. Woodall-Duckham vertical retorts capable of carbonizing 96 tons of coal per day, from which 1,762,000 cu.ft. of 460 B.Th.U. gas is obtained. The retort house has been made suitable for a further similar bench of twelve retorts to be installed at a later date, the coal and coke handling machinery being of sufficient capacity to deal with this, and the whole plant arranged to simplify any future erection.

The retort bench is of the latest design and forms an entirely independent unit of the carbonizing plant, complete with waste heat-boiler. Augmentation flues from the producers to the latter have been included to maintain the maximum steam production to provide a surplus for general works purposes.

The existing coke storage bunkers and bagging platform adjacent to the plant have been considerably extended, new coke screens, coke bagging machinery, and travelling debreezing screen being included in the scheme.

Suitable cloakroom and messroom accommodation to comply with the 1937 Factories Act was necessary at the works, and this has been provided by constructing two floors over the roadway between the existing and new carbonizing plants. The structure forms a connecting link between the two plants at the upper levels. The first floor over the roadway has been utilized as a cloakroom and fitted with six shower baths with thermostatically-controlled water-mixing valves, twelve wash-basins, clothes drying racks and lockers for clothing. The upper floor provides mess-room facilities, including a kitchen where meals can be prepared.



Top Hoppers and Gas Offtakes

The messroom and cloakroom walls are tiled to a height of 6 ft., and the floors are also tiled so that cleanliness can be easily maintained. Ample window space is provided to give a good light throughout.

The central heating system and hot water for washing is provided from calorifiers utilizing the heat in the exhaust steam from the various steam engines on the works.

# N.G.C. Central Executive Board Meeting

A meeting of the Central Executive Board of the National Gas Council was held at Gas Industry House on Tuesday, Oct. 10, at 2 p.m. The PRESIDENT, Sir David Milne-Watson, Bart., LL.D., D.L., was in the Chair.

Before proceeding with the business of the meeting, the Chairman referred to the death of Mr. S. E. Halliwell, F.C.I.S., Commercial Manager and Secretary of the Bristol Gas Company, who had been a member of the Board for 20 years. The Chairman, in paying a tribute to the memory of Mr. Halliwell, referred to the good work which he had accomplished for his Company and to the loyal co-operation the Council had always received from him.

The Board stood in silence as a tribute to his memory.

## National Emergency

It was reported that advisory communications had been addressed to members on the following matters:

(1) War Risks Insurance Act, 1939.
(2) Priority in Supplies.
(3) Fuel and Lighting Order, 1939.

It was reported with regard to the first two items that the Council had achieved a measure of success inasmuch as coal, coke, and hire-purchase appliances had been exempted from the War Risks Insurance Scheme, and with regard to Priority in Supplies that public utility undertakings had been placed on the list of those who could receive iron and steel supplies without a licence in so far as such materials were required for repair and maintenance work for the purposes of the undertaking.

With regard to the Fuel and Lighting Order, the steps which had been taken to deal with the problems arising under this Order were reported, and certain decisions were taken by the Board thereon. In this connexion resolutions were submitted to the Board from:

(a) the Yorkshire (W.R.) District Executive Board, dated Sept. 19, 1939;

and

(b) the Yorkshire Commercial Section of the Manchester District Association of Gas Engineers and Managers, dated Sept. 19, 1939.

## Coal

*District Advisory Committee for Coal Supplies—No. 9 District.*—It was reported that Colonel Norrington had agreed to take the place of the late Mr. S. E. Halliwell as spokesman for the Gas Industry on No. 9 District Advisory Committee. Other matters in connexion with urgent coal questions which had arisen were the subject of discussion.

The position of the Gas Industry arising out of the war was surveyed from every angle, and a course of action was decided upon in relation thereto.

## House of Lords Enquiry into Holding Companies

It was reported that it had been decided that in present circumstances and in view of the large number of interests and persons involved, the Committee of the House of Lords had adjourned the Enquiry *sine die*.

It was decided that the next meeting of the Board should be held on Tuesday, Nov. 14, but that instead of the meeting being held in the afternoon, as usual, it should take place in the morning at 11 o'clock.

# CONTINUITY . . .

THE Woodall-Duckham Companies have temporarily transferred their records and staff to pre-arranged quarters at Guildford in order to ensure, as far as possible, continuity of their service to the Gas and Coking Industries.

Their Engineers, Operators and Research Staff are available to Industry in connection with any matter in which their services can be utilised.

At the present time, the Woodall-Duckham Companies are engaged in executing as rapidly as possible the large volume of constructional work they have in hand for the Gas and Coking Industries.

THE WOODALL-DUCKHAM VERTICAL RETORT AND OVEN CONSTRUCTION CO. (1920) LTD

*Temporary Address:*

UPLANDS, EPSOM ROAD, GUILDFORD

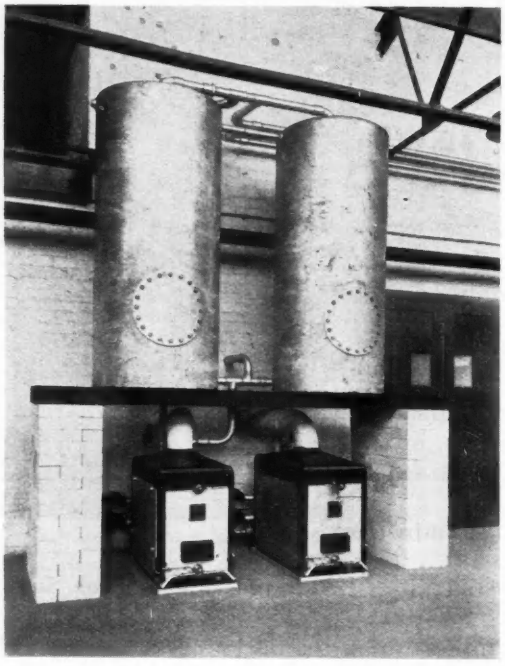
*Members of the Society of British Gas Industries*

Telephones: Guildford 3267 & 3268 Telegrams: Retortical, Guildford

T.G.S.

# GAS WATER HEATING FOR A.R.P. PURPOSES

**A primary consideration in any first-aid post or decontamination centre is undoubtedly an adequate supply of hot water, while both here and in other places where A.R.P. personnel have to stand-by 24 hours a day proper heating arrangements are of almost equal importance**



*Typical example of Potterton direct-heated gas-fired storage system for hot water supply and central heating at a large decontamination centre*

As will have been gathered from the various notes on the subject which have appeared in recent numbers of the "JOURNAL," gas has been found to offer the only really practical solution of a problem which demands ever-ready and unfailing supplies of hot water for emergency services. Gas is the only means of providing instantaneous hot water at a turn of the tap, while its capacity for "quick recovery" renders it the most suitable fuel where a large bulk of storage constitutes a necessary part of the scheme.

It is with the latter system that we are more particularly concerned in this article, for it will be readily conceded that, excellent as the many types of instantaneous heater are in a wide variety of applications, we are dealing in war-time with conditions under which a sudden interruption of both gas and water services must be visualized. For that reason, adequate storage is an essential feature. Moreover, in many instances it is desired to incorporate a central heating plant in the same system or in connexion with it—another function which gas boilers can effectively and economically fulfil.

Many technical considerations are involved, for procedure must be regulated according to a variety of factors, not least of which is the kind of building and whether the installation is to be of a temporary or permanent character. In the following notes we have selected some actual examples of installations lately completed by Thomas Potterton (Heating Engineers), Ltd., which are typical of the contribution which gas can offer to the National cause. For obvious reasons, the situation of the plant is omitted, but it may be observed that they include military barracks, first-aid posts, decontamination centres, hospitals, police headquarters, munition works, industrial wash-rooms, and so forth.

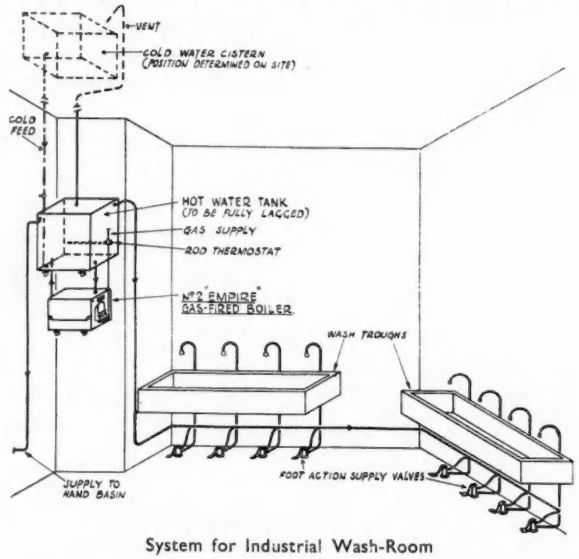
## Central Blenders

In hot water supply work for showers, Messrs. Potterton often recommend heating in bulk to a controlled temperature of, say, 105° F. In this way water at the appropriate temperature can be brought direct to the point of use, without any need for individual blenders or mixing valves at each shower with the consequent duplication of supply pipes—hot and cold. Where space is available and adequate storage tanks can be used this is undoubtedly a most satisfactory method, and Messrs. Potterton combine with it press-valve controls to avoid any risk of water being wasted by the bather forgetting to turn off the supply after use.

A further point about these "maximum temperature" systems, as they are termed, is that they enable delivery to be obtained through single branches, as the small amount of cold water can be run off by the bather before entering the shower. Where full mixing valves are used, however, it is considered necessary to employ secondary circulations to carry the hot water to within close proximity of the blenders; otherwise bathers might experience a sudden rush of hot water owing to the blenders being set high during the period before delivery of the hot water to the joint connexions—that is, of course, unless thermostatic blenders are adopted. In many cases a single blender—either manually or thermostatically controlled—is used to serve a number of showers.

An example of this type of shower apparatus carried out by the firm incorporates a 150-gallon storage cylinder operating at approximately blood heat, with press-valves on dead-leg supply—a matter of 15 ft. run. The showers in this case work satisfactorily with a consumption of one gallon per minute. The 150-gallon storage will enable the showers to be used continuously for forty minutes, while the recovery rate of the gas boiler is approximately 100 gallons per hour at the required temperature.

Another system employs two storage tanks, capable of being worked in three variable capacities, it being arranged that both tanks can be heated jointly, one tank independently, or the upper part of one tank only. This system operates at a high temperature, the purpose being to carry the heated water some distance through a secondary circulation, the delivery to the showers being through blenders. In this case the storage tanks are covered with plastic asbestos having an interlayer of magnesia, and the pipe work insulated with glass silk to effect economy in radiation losses, this being of great importance where the apparatus is kept standing by at a high temperature both day and night.




System for Industrial Wash-Room

In certain industries the nature of the work necessitates the operatives washing their hands under running water instead of in bowls, and a special system installed by Messrs. Thomas Potterton for this purpose embodies foot-operated trigger-action controls, thus economizing the hot water. Here, again, the water is set at the necessary temperature without the addition of cold.

At a first-aid post "somewhere in the southern counties" an existing building has been converted for war-time emergency use.

Here there is an "Empire" lagged storage set with 100 gallons reserve, controlled to operate at, nominally, 100° F. for shower purposes without blenders or mixing valves. An auxiliary heating apparatus is also provided in the form of a No. 20 "Victor" boiler with a circulation of hot water pipes carried slightly above headroom to render the premises habitable. This is a case where gas has served a valuable purpose, for, while other equipment of this nature is being operated by solid fuel, the location of the building is such that the gas apparatus had to be installed separately, the additional expense of building a chimney and erecting fuel storage and heating chamber being obviated.

### For Clothes Airing

At a Police Headquarters the exigencies of A.R.P. necessitated the use of a three-storey building for storage of special clothing, and provision for keeping them aired.

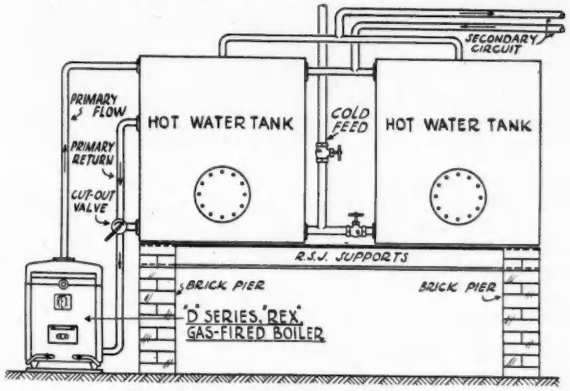
A Potterton boiler serves a series of overhead heating pipes on each floor, the gas to the boiler being controlled by an air temperature thermostat. Gas was chosen in this instance as the building is kept locked, and up to the outbreak of war was only visited once per week.

An important installation of gas-fired hot water supply in a munition works has special characteristics. In this instance, by reason of the large volumes of hot water required, it was not found practicable to store the water at ordinary bathing temperature; but in order to operate the showers without a large number of mixing valves and dual hot and cold pipes with secondary circulation, &c., a blender has been fitted in the main outlet of the storage cylinder—which answers the same purpose as a number of separate units at each shower.

This installation is divided into two complete sections, housed in a special chamber and earthed over. The hot water is delivered to the various points of use in trenches well beneath the surface of the ground.

Two big Decontamination Centres in London provide examples of water heating by gas on a large scale. The centres are each designed to cope with 320 people with an inflow rate of 160 per half-hour. The storage capacity in both cases is 400 gallons, fed by a "D" Series "Rex" boiler having a rating of 165,000 B.Th.U. per hour. These are high temperature systems, each serving a dozen showers through two thermostatic blenders, supplying a series of six showers. The buildings comprising these Decontamination Centres are maintained at 60° F. by No. 1 Series "Rex" boilers which also have a rating of 165,000 B.Th.U. per hour.

Other decontamination centres served by Potterton gas-fired boilers include one capable of accommodating 250 people with an inflow of 125 per half-hour, and 120 personnel with an inflow




Typical Layout of Gas-Heating Plant

of 60 per half-hour, the capacity of the storage cylinders in these instances being respectively 300 gallons and 200 gallons.

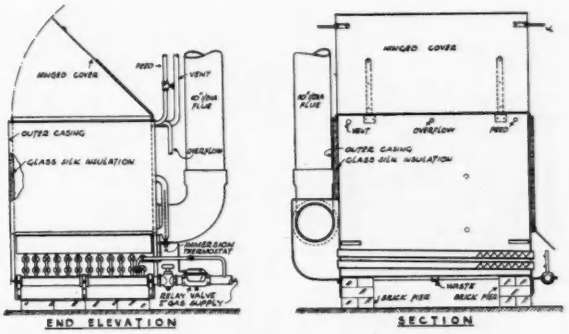
For districts where the water is very soft direct heating, even with a bower-barffed cast-iron boiler, is sometimes undesirable. In a typical instance two copper indirect cylinders are provided, one of 250 gallons and the other of 150 gallons capacity, the larger cylinder having a double annular ring to obtain the surface necessary to heat both storages within the same time. Either storage can be heated separately if required, thus providing three capacities—viz., 150, 250, or 400 gallons as occasion demands. The boiler in this instance is a No. 1 Series "Rex" having an output of 165,000 B.Th.U. per hour.

Where water is suitable for the use of cast-iron boilers either bower-barffed or otherwise direct heating is to be preferred, for the very good reason that it is more efficient as regards gas consumption as well as more rapid in recovery.

### Treatment of Protective Clothing

The foregoing is a brief description of a few of the many installations for dealing with the personnel of various squads, but attention has also to be given to the protective clothing discarded by the personnel before entering these buildings.

To decontaminate the clothing a specially designed laundry is required, and this should contain covered tanks which can be




Gas-Heated Decontamination Tank

quickly brought to boiling point and maintained at a temperature of 95° to 100° C. for half an hour, the clothing being in a basket so that it can be easily lifted out for drying purposes without any serious friction on the clothing which would at this temperature destroy the insulation.

The British Standards Institution has prepared a Specification for such baskets, which consist of perforated metal plates 10 in. apart for shelves, upon which the clothing rests, the whole being enclosed with wire sides. Messrs. Thomas Potterton have designed a special form of gas-fired tank to receive this basket when filled with clothing.

These decontamination tanks have a capacity of approximately 400 gallons and can be brought to boiling point in one hour, when the gas is immediately controlled thermostatically to avoid any fast boiling which is liable to set up friction of the clothing, again to the detriment of the insulation.

The heating element of these tanks consist of a series of 2 in. fire-tubes through a chamber below the plates upon which the clothing basket rests, and an independent jet is provided to each tube, one tube only having an independent uncontrolled supply to be maintained for simmering purposes. The gas is consumed at a separate jet for each tube, and it is carried through the tubes by the inducement of the flue stack. The sides of these tanks are adequately lagged, and provision is made for cold water supply, the ventilation of the steam and gasses driven off, also overflow and waste pipes.

To reduce the amount of clothing necessary for any given number of personnel, quick washing and drying is essential. Special drying rooms are therefore provided ,and these also can be heated by direct gas furnace, carrying heated air through the clothing in the drying room. The clothing is fitted on special wire hangers to keep the arms and legs apart so that they dry on the internal surfaces, the matter being otherwise impervious to air currents and saturation.

---

# Midland Junior Gas Association

### Presentation of Milbourne Medal

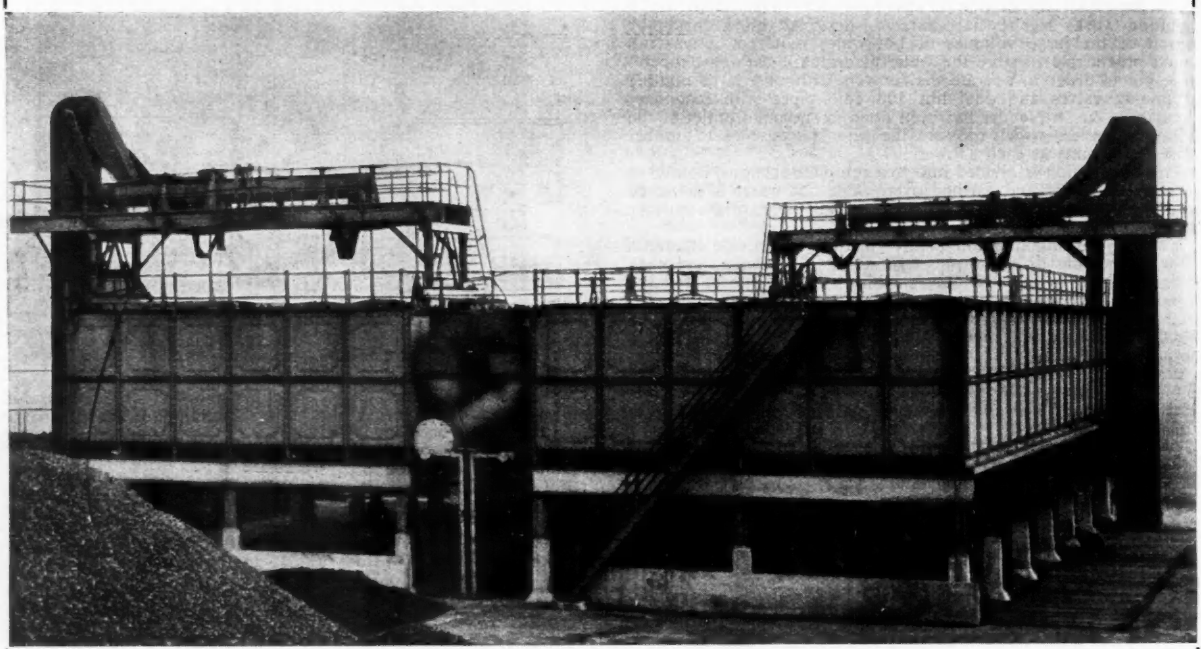
Owing to the cancelling of the activities of the Association for the time being, the winner of the "Milbourne" Medal for the session 1938-39 was presented with his award at the offices of the Coventry Gas Undertaking on Thursday, Oct. 12.

The recipient was Mr. F. A. C. Pykett, the Distribution Engineer of that Undertaking for his Paper "The Distribution of Gas at Coventry." The President, Mr. A. W. Attwood, called upon Mr. P. N. Langford, the Engineer and General Manager, to make the presentation in the presence of a large gathering of the staff.

Mr. Langford commented on the unavoidable absence of Mr. R. J. Milbourne to make the presentation, and congratulated Mr. Pykett on his success, saying that it was a distinction well deserved, as he had worked diligently for the Junior Associations for many years both in the North and in the Midlands.

Mr. Pykett, in acknowledging the Medal, said he hoped to continue his interest in the work of the Junior Associations until the time came for his retirement, which fortunately was many years ahead.

# PURIFIERS



Six cast iron Purifiers 30′ 0″ x 30′ 0″ x 10′ 0″ deep on steel sub-structure, with two sets of Travelling Oxide Elevators and Cover Lifting Apparatus, erected at the Granton Gasworks of the City of Edinburgh Gas Department.

## ROBERT DEMPSTER & SONS LTD.

Wire: "DEMPSTER," ELLAND

**ELLAND**

'Phone: ELLAND 2241,2242,2243

LONDON OFFICE: 16, Queen Anne's Gate, Westminster, S.W.1

Wire: "ELLANDORS, PARL, LONDON." 'Phone: Whitehall 2661.

# Three Years' Progress at Perth

**This Paper was to have been read at the Annual Meeting of the North British Association of Gas Managers at St. Andrews on September 7. As the meeting had to be cancelled, a full discussion on the Paper has been invited, which together with the Author's reply will be subsequently published in the Technical Press. Contributions should be addressed to the Author.**

by

A. C. REA, A.M.I.Mech.E.

(Engineer and Manager of the Perth Gas Department)

When our President approached me some time ago with a request that I might present a Paper to this Meeting of the North British Association of Gas Managers he informed me that he would leave the subject in my own hands and I felt I could not do better than tell you of my endeavours to justify my appointment, over two years ago, as Engineer and Manager at Perth.

### Distribution Practice

It can be taken that the first requisite of a successful undertaking is to have satisfied consumers, and no consumers will be satisfied unless they have an adequate supply of gas at all times.

Housing developments in Perth, as in other towns, have been substantial, but in our case the development has taken place on the side of the City remote from the gas-works, causing inadequate pressure difficulties. It was necessary to lay a new trunk main from the works to the City and to tie this up to the existing system at strategical points. Stanton-Wilson pipes and joints were used throughout, and the whole job was tested in sections during laying with air pressure at 4 lb. per sq.in. The route chosen was one which avoided main roads as far as possible and branches were left en route for future extensions. The total cost of the scheme was approximately £6,000.

A junior draughtsman was appointed to prepare a new set of main plans on the latest editions of ordnance maps, so that the whole distribution system could be traced. All service jobs are logged, with sketches of work done, and all syphon traps have been located and dips recorded at each visit. Valves have been similarly recorded. These records have been built up partly from old plans, from personal knowledge of foremen and mainlayers, and from records of openings made.

It is a job which takes considerable time and enquiry to ensure accuracy, but the value of knowing the details of the distribution system allows of more scientific tracing of faults or failures. The ordnances have been prepared in duplicate and a set kept in two different offices in case they should be destroyed by fire.

All the low-pressure gas is supplied through a 24 in. Peebles automatic governor. I cannot speak too highly of the services of this apparatus in maintaining adequate pressures on the district at all times. It applies the increase in pressure as and when the demand rises without reliance on the human element, or the pre-judgment of the probable pressure requirements which may or may not be correct.

Fig. I is a typical chart with the district pressures at points 1½ and 2½ miles from the works, superimposed on the outlet and inlet governor pressures.

### Gas Meters

The gas meter is apt to receive less attention than it should, and in many cases it is only removed when necessity arises through complaints, and that time is just one day late.

Circumstances surrounding the working of meters vary so much that it is difficult to determine when they should be brought in for inspection and overhaul. It is also one of those jobs which on the face of it appears to be so much expenditure wasted.

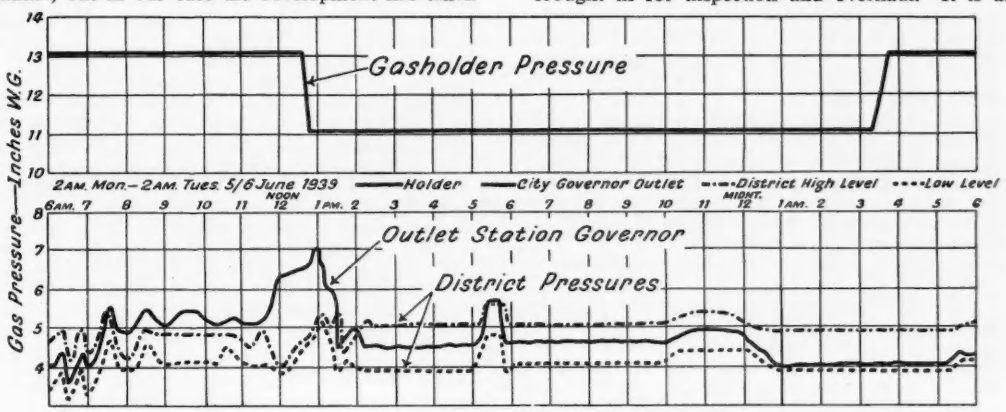



Fig. I

We do all our own meter repairs in Perth, and have a well-equipped shop with two men and two apprentices. We reviewed all our consumers' cards, and found that one-third of the meters on the district were over 20 years old. Over 4,000 meters was a formidable number to tackle, and it was decided to bring these in over a number of years. The 2 light meters were scrapped, and a 3 light replaced only where a single appliance was in the house and not likely to be increased.

The standard new meter purchased is the 100 cu.ft. Institution small high-capacity. This type has been subjected to very severe tests both on the bench and in practice and I am satisfied that its adoption for all loads up to its capacity is justified. Its convenience in size when replacing small light meters where increased capacity is necessary is a saving in replacement costs in that the overall dimensions are not increased, and in new installations it can be accommodated more conveniently.

Maximum size of cash box has been insisted on to avoid additional collections between surveys. Dual coin prepayment mechanism is standard, as it was found that only a small fraction of consumers exercised the option to use silver coins.

The meter exchange is undertaken during the slacker times in summer. It will take about ten years to get round the whole district, the rate of exchange being governed by the

repair shop output. Each meter is tested on being brought in before any repairs are effected, to check its accuracy. These results for the past two years are:

| Year. | No. tested. | No. Standing or Bound. | Accumulated error. |
|---|---|---|---|
| 1937/38 ... | ... 1,556 | 171 = 11% | + 0.157% |
| 1938/39 ... | ... 1,488 | 268 = 18% | + 2.253% |

The individual errors of meters vary considerably, but it is rather surprising to find that when the positive and negative errors are added, the final result is in favour of the undertaking. This is the result of testing on the bench at badged capacity for error and 4 cu.ft. per hr. for "standing." It is also impossible to say with what accuracy the bound or standing meters were functioning, so that the accumulated error is not a strict indication of the working error.

### Sales Policy

Outside selling has been adopted for both water heaters and refrigerators, and considerable success has followed this policy. It was started by representatives of the manufacturers, but is now being carried on by our own staff in the summer season.

Each consumer has a census card. These very soon become out of date if not checked. To keep the census cards up to date and the fitting staff fully employed during the slacker summer periods, two likely members are selected to call on consumers. By this policy each consumer is visited every two years.

These fitters also check up on appliance performances and make minor overhauls, and incidentally do a bit of salesmanship, with the result that a surprising amount of new business is brought in. This outside selling policy has stimulated sales to such an extent that now more appliances are sold in summer than winter.

Adequate stocks of all approved appliances are carried, so that no unnecessary delays occur in fixing. This service is always appreciated and has led to many sales which would not have been clinched except on promise of early fixing. This especially applies to refrigerators, where people are influenced by immediate weather conditions, and in our varied climate you must strike while the consumer is hot.

Water heating is a very desirable load, but is not so easily sold as any other, because two commodities are involved—namely, gas and water—and it is the latter which presents most difficulties.

It was our experience that a large proportion of prospects broke down between the gas showroom and the plumber, for divers reasons. A proposal was therefore put to the Master Plumbers' Association that the plumbing work involved in fixing sink-heaters must always represent approximately the same amount of material and labour. They agreed, and an all-in price of 19s. 6d. per heater was arrived at with chromium-plated pipes.

This price is included in our cash and hire-purchase selling prices to the consumer. The housewife has not therefore to bother about interviewing a plumber, and the plumber is sure of his money. A similar agreement has been arranged for fitting circulators to existing storage tanks, the plumbing charge being 50s. in copper or 57s. 6d. in chromium-plated pipe. The consumer can choose her own plumber in both cases.

The same practice has been extended to the fitting of gas-ignited coke fires. The inclusive charge being 25s. if they require building in with baby bricks. Any work in addition is done on estimate.

Chromium-plated brass tubing is used in fitting all modern appliances, to be in keeping with their high-grade finish.

### Advertising

An increased use of advertising has been part of my sales policy, and it has paid a very good dividend in increased sales per consumer during the last three years. The amount spent was £391, £467 and £440, or approximately ¼d. per 1,000 cu.ft., and sales per consumer totalled 14s., 20s. and 18s. 9d.

The principal medium has been the local Press. In a small town like Perth the bi-weekly local paper is read by most people from cover to cover, and I believe that it can be of as great value to our undertaking as national advertising.

It is essential to raise the prestige of the undertaking in the eyes of the public, and this can effectively be done by a good local Press, which is well worth cultivating, and this cultivation is easiest achieved by a liberal support in advertising space. Once this happy acquaintance has been engendered write-ups are usually willingly given free space, and such matter may prove to be more effective with the public than the ordinary run of advertisement.

We carry a large stock of blocks covering every topic, so that any opportunity can be seized at short notice, and I consider it essential that a pictorial block of some kind be included to convey the essence of the advertisement without the necessity of reading. Mr. Therm is featured on all occasions.

A monthly supply of B.C.G.A. posters are received and displayed on old "Empire Marketing Boards" on four sites. All our vans and lorries have poster frames attached to accommodate 20 in. by 30 in. posters.

A big variety of slides are kept for display in a local cinema, and during three spring months of this year films from the B.C.G.A. Library were hired for one week each month. One on cooking and two on water-heating were shown to a total audience of 31,000 at a cost of under £20.

The B.C.G.A. films are not ideally suited for showing to existing cinema audiences. Most are too long, and all are put to a rather severe test against the tempo and standard of regular films. A careful selection must be made, with humour and brevity predominating. Most cinemas have their regular patrons, and they must not be overdosed by propaganda, lest the opposite effect is produced. If the gas film can be incorporated with a star programme a greater number of people will view the film.

I have been very gratified at the response in increased water heater sales since showing the films, but, as in advertising generally it is difficult to allocate credit to any particular effort. There is no doubt, however, that the cumulative effect brings business.

### New Carbonizing Plant

The increasing demand for gas in Perth is indicated by the following figures for the last three years:

| | Gas Made. | Gas Sold. |
|---|---|---|
| | Million cu.ft. | |
| To May 15, 1937 ... ... | 427 | 380 |
| ,, 1938 ... ... | 441 | 402 |
| ,, 1939 ... ... | 451 | 411 |

The carbonizing plant in commission prior to 1939 consisted of 40 Glover-West vertical retorts, 30 in. by 10 in. by 20 ft. 6in. long, in five beds of eight retorts each. Four of these settings were built in 1922-23, and the fifth was added in 1925. The maximum daily output during the prolonged cold spell of last winter was 1.8 million cu.ft. and this necessitated all 40 retorts being in operation with nothing in reserve. Not only in the interest of safety, but also in order to cope with the continued growth in demand, it was evident that more plant was urgently required. The existing retort bench could not be extended. A complete new unit, therefore, was planned, to be built parallel with the existing installation. The 50 in. by 10 in. retort 25 ft. long was adopted for the new installation. The available space is laid out for the reception of five beds of eight retorts each, which will ultimately give a 200% increase in gas-making capacity. In the first instance one bed of eight retorts has been built with provision for the addition of a second bed in the immediate future. It is arranged that ultimately the projected line of plant shall be built in two units, one of two beds and one of three beds, thus providing for two units of different outputs which can be used independently or together so as to give the maximum facilities for flexible working and ease of repair.

With this first section of the new installation, the coal and coke plant is capable of supplying the whole of the ultimate five settings. Two hydraulic ram wagon tippers are placed on the railway which runs across the permanent end of the two installations, with feeder, coal breaker, and gravity bucket conveyor. This conveyor also receives coke from the retorts and elevates it to the coke storage bunkers. These have a capacity of 350 tons. They are of steel-frame construction with 4½ in. brick panels, the cones being lined with firebrick "scones." Static screens sort the coke into three sizes, and spiral chutes are provided to convey it into the bunkers to avoid breakage. At the outlet of the bunkers the several sizes

of coke pass over a travelling de-breezing screen of the C.C.L. design, which is so arranged that railway wagons, motor lorries, or bags can be conveniently filled. An electric lift gives access to all working platforms. Duplicate drives are provided both for the coke extractor gear by steam and by gas engine and the gravity bucket conveyors by steam engine and electric motor.

The retort house building, the waste-heat boiler, retort house governor, and gas mains have been arranged for the two settings. Automatic and hand relief valves have been fitted to the foul main, so that the retort bench will be protected from the effects of any voluntary or involuntary stoppages of the exhauster plant.

Breeze produced in this bench is used to supplement the producer fuel which is de-dusted, the fines being used in the works boiler.

No coal is burned as fuel on the works, as I cannot reconcile the practice of using bituminous fuels and expecting our consumers to support smoke abatement, by using the gas and coke which we produce. We must have the courage to practise what we preach. Our sales arguments are greatly strengthened if we can show our prospective consumers that we are actually using gas and coke in our own boilers.

### The New Heating System

The new setting is a very considerable advance in design, in which the basic principles of the Glover-West system of heating are maintained, while problems relating to allowance for expansion are solved, and control of temperature throughout the whole setting is perfected.

It will be seen from the drawing (Fig. 2) that producer gas is supplied to both sides of the setting, so that the flames of combustion travel equally from the two sides to the centre in each of the six superimposed combustion chambers. The hot products of combustion leave each combustion chamber by a vertical flue, formed by leaving suitable openings in the floor, in the centre of the setting, the products of combustion from the several chambers mixing and passing into the waste gas circulating chambers, which are arranged around the upper ends of the retorts in the usual manner. The admission of both producer gas and air to the combustion chambers is controlled by graduated and interchangeable nostrils. The secondary air is drawn from the heated atmosphere immediately below the retort bench and rises in the division walls forming an insulation of the outer setting walls.

One of the most important advantages of this design is that the setting is symmetrical about the retorts—i.e., instead of having a heavy producer wall conveying all the producer flues, the two walls are now of similar thickness carrying their own vertical flues, so that expansion takes place evenly across the setting. Expansion is allowed for not only between the outer face of the brickwork and the retort bench bracing but also on the centre line of the setting.

The producers themselves are entirely independent of the setting, so that expansion and contraction in them is not transmitted to the mass of the retort bench.

Several improvements have also been made in the design of the fittings on the top of the bench, mainly with a view to reducing to a minimum losses by radiation in this part of the system. The top mouthpieces are completely brick-lined, and the coal feed hoppers have been re-designed to give a stream-lined effect, while providing for two hours storage capacity. This arrangement affords a useful increase in working space on the platform and more comfortable conditions. The general effect of the improvements is clearly seen in the greatly reduced fuel consumption figures, referred to below.

The new setting (of eight 50 in. retorts) is heated by a step-grate producer equipped for pressure burning. It was decided to put this into operation burning run-of-retort coke. The advantages of a pressure-equipped producer over the ordinary natural-draught type include easier control of heats, more even temperatures throughout the combustion chambers (as it is possible to work the setting nearer pressure conditions throughout), fuel saving due to easier fire cleaning, and a producer gas of higher calorific value.

### Fuel

An average sample of fuel fed to the producer gave the following analyses:

| Hand Grading. | | Proximate Analysis. | |
|---|---|---|---|
| Over 1½ in. ... ... | 65.14% | Air dried moisture ... | 0.93% |
| ½ in. — 1½ in. ... ... | 16.98% | Dried at 105° C. ... | 1.02% |
| ¼ in. — ½ in. ... ... | 8.94% | V.M. ... ... ... | 1.44% |
| Under ¼ in. ... ... | 8.94% | Ash ... ... ... | 9.84% |
| | | Fixed carbon ... ... | 87.70% |

Over one week's working with combustion chamber temperatures of 1,200° C.-1,250° C., and a throughput of 4.1 tons per retort per day the percentage fuel used was 8.89%. This figure was an indication that at normal carbonizing

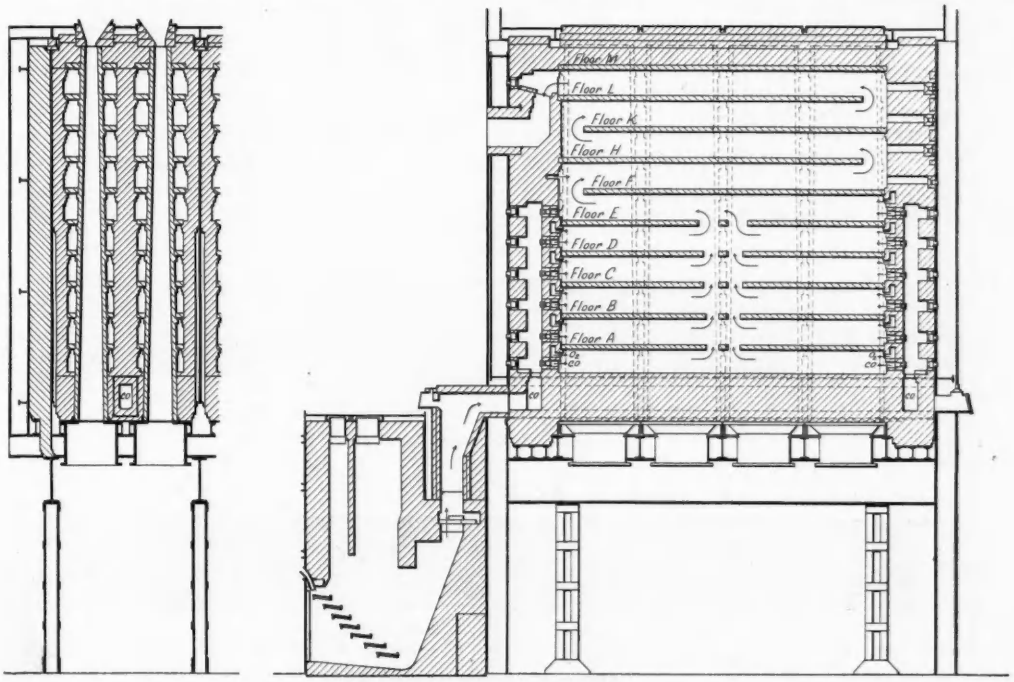



Fig. 2

temperatures and normal throughput of 5 tons per day per retort, a figure a little over 10% should be obtained.

### Operation of Pressure Grate

The setting having been adjusted and balanced, the reducing valve on the steam line to the producer was set at 25 lb./sq.in. and the West-Taylor valve adjusted to give a pressure of 5/100 in. W.G. in the common flue when the uptake dampers were adjusted to give a pressure of 1/100 in. W.G. in the producer gas uptakes above the main producer gas dampers.

The following is a heat chart of one row of combustion chambers:

| | | |
|---|---|---|
| Circulating chambers | 10 | 1,000° C. |
| | 9 | 1,090° C. |
| | 8 | 1,170° C. |
| | 7 | 1,250° C. |
| Combustion chambers. | 6 | 1,270° C. |
| | 5 | 1,290° C. |
| | 4 | 1,310° C. |
| | 3 | 1,310° C. |
| | 2 | 1,300° C. |
| | 1 | 1,290° C. |

With an increase in throughput it was found that very simple adjustments were required to maintain the heats at about the above temperatures.

By increasing the number of notches on the special ½ in. West-Taylor valve and opening the four main control dampers to the waste-gas flue the temperatures were maintained without making any material difference to the zoning of the heats. It should be explained that the West-Taylor valve is of the parabolic needle valve type, so that the quantity of

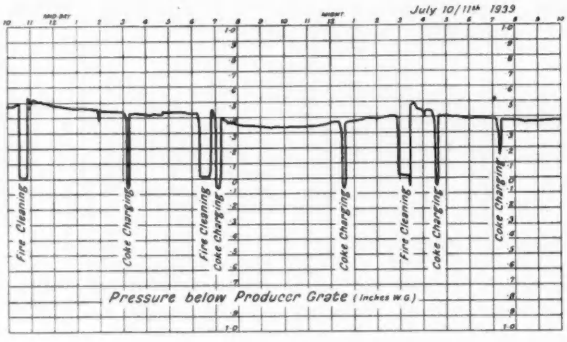



Fig. 3

steam passed is proportional to the valve opening—which is indicated by notches in the rim of the valve body engaged by the spring-loaded catch in the operating lever.

When the waste-heat boiler was put into commission the necessity of making adjustments to dampers was done away with, as control of draught on the setting could be obtained by opening or closing the damper on the fan duct at the outlet of the boiler, this being simply effected by the turning of a control wheel geared to the damper. Thus the control of the setting was reduced to the operation of a steam valve and a control wheel.

### Charging and Cleaning

The producer is charged every four hours, the capacity of the producer being such that if it is charged four hours before cleaning there is no danger of the level of the fuel falling

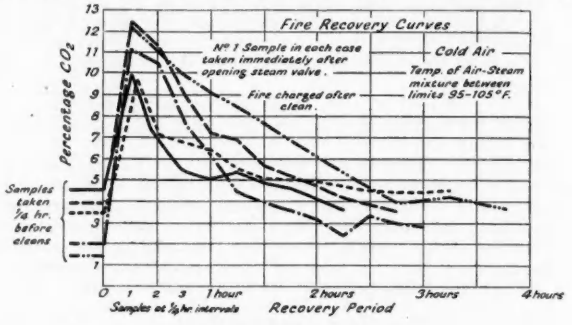



Fig. 4

below the curtain arch at the cleaning period, the producer receiving the next charge immediately after cleaning.

The following are figures relating to fire cleaning and recovery after cleaning:

Average conditions 15 minutes before cleaning.

| | |
|---|---|
| Grate pressure | 3.2/10 in. W.G. |
| Uptake flue pressure | 2/100 in. W.G. |
| Temperature of air-steam mixture | 105° F. |
| Steam pressure to blower | 24.5 lb./sq. in. |
| Number of notches on W-T. valve | 7 |

The cleaning period is 20-35 minutes, depending on the state of the fire.

| | | |
|---|---|---|
| Fuel used between cleanings | | 28 cwt. |
| Weight of wet ash and carbon removed | | 6 cwts. |
| After cleaning : | Grate pressure | 4.2/10 in. |
| | Flue pressure | 1/100 in. |
| Two hours after : | Grate pressure | 3.5/10 in. |
| | Flue pressure | 4/100 in. |

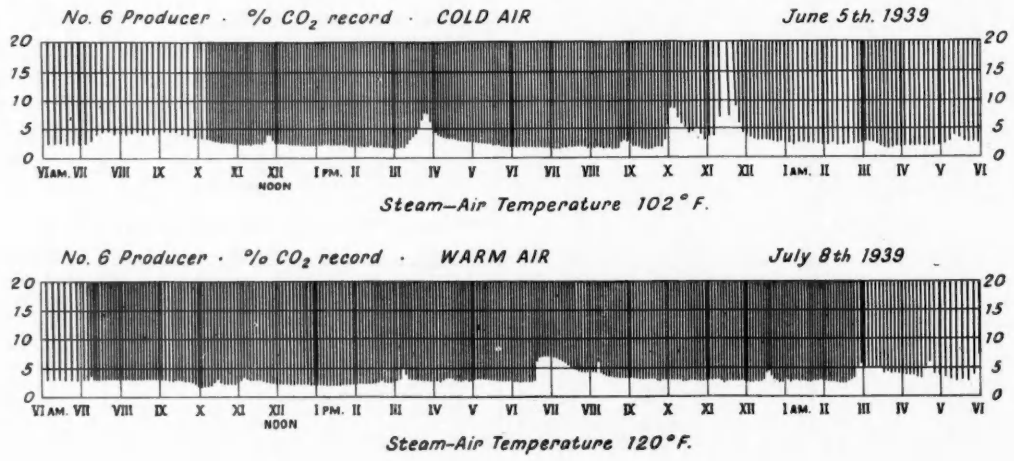
The above are fully illustrated in Fig. 3.

The higher initial grate pressure is assumed to be mainly due to "blanking" up the grate plates with fine ashes to prevent short circuiting of the primary air and steam. The recovery times and $CO_2$ content of the producer gas are shown on the Sarco charts and graph (Figs. 4, 4a, and 4b).

The low $CO_2$ content of the producer gas is a good indication of the efficiency of the producer, the steam-air mixture getting maximum time contact in the fuel bed. Fig. 5 is of some interest as showing the observed relation of CO to $CO_2$ in the producer gas compared with the theoretical ratios.

### Preheated Air

The extractor house is built with the producer wall as one of its end walls, and with a view to increasing still further the


No. 6 Producer · % CO2 record · COLD AIR
June 5th. 1939
Steam–Air Temperature 102° F.
No. 6 Producer · % CO2 record · WARM AIR
July 8th 1939
Steam–Air Temperature 120° F.

Figs. 4a (top) and 4b

# CAMOUFLAGE FOR GAS HOLDERS

WITH

# GRIFFITHS CAMOUFLAGE PAINTS

ALL SPECIFIED COLOURS IN ACCORDANCE WITH GOVERNMENT REQUIREMENTS

CAMOUFLAGE SCHEMES PREPARED IF DESIRED

**GRIFFITHS BROS. & CO. LONDON LTD.**

*Paint, Enamel and Varnish Specialists*

**Macks Road, Bermondsey, S.E.16**

ALL TYPES OF A. R. P. PAINTS SUPPLIED INCLUDING:

**"ARMOUR" BLACK-OUT PAINT**
**"ARMOURGLO" LUMINOUS PAINT**
**"ARMOUR" WHITE KERB PAINT**
**"SHAYDOLITE" BLUE LAMP LACQUER**

*Write for further particulars.*

efficiency of the producer, it was decided to use the warm air from the extractor house for the supply of primary air to the producer. The primary air is thus free from dust, and a higher temperature of air-steam mixture is obtained without increasing the ratio of steam to air. The air is led from the extractor house to the blower head by means of a 12 in. by 18 in. light sheet-iron rectangular duct, the open end being

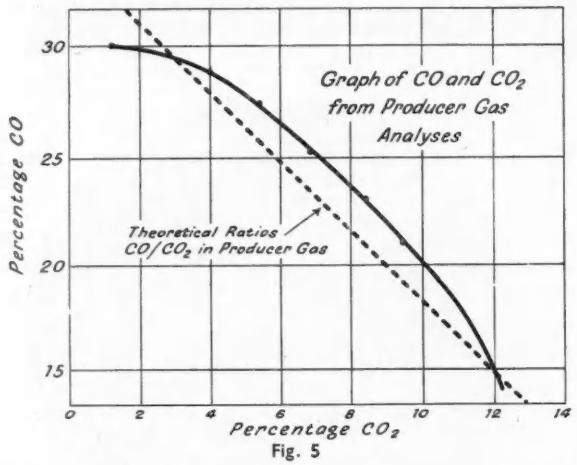


Fig. 5

at right angles to the producer wall and 1 ft. distant from this wall.

The following figures show the improvement in conditions:

| Average Temperature of Inlet Air. | Temperature of Air-steam Mixture. |
|---|---|
| Cold Air ... ... 60° F. | 102° F. |
| Warm Air ... ... 110° F. | 120° F. |

The fire-recovery graphs and $CO_2$ charts (Fig. 6) indicate that, with warmer primary air the fuel bed tends to quicker recovery after cleaning. The preheating of the air also improves the thermal efficiency of the producer.

Temperatures of the engine house (indicated on a thermometer 12 in. from the producer wall) prior to introduction of the air duct to the blower ranged from 170° to 180° F. The temperatures after this modification was made are reduced by 70°.

The following figures show the fuel consumption over periods of weekly observations:

| Week ending | April 12 | April 19 | April 26 | May 3 |
|---|---|---|---|---|
| Coal carbonized ... ... tons. | 224 | 266 | 258 | 282 |
| Throughput per retort per day " | 4.01 | 4.75 | 4.6 | 5.04 |
| Fuel to producer ... ... " | 23.4 | 25.6 | 25.5 | 28 |
| Percentage fuel to coal carbonized | 10.48% | 9.62% | 9.88% | 9.93% |

At the end of the fourth period the waste-heat boiler was brought into commission, and as its capacity is such that it can take the waste gases of two similar settings, it was decided to bring it nearer to full capacity by augmenting the waste gases with excess producer gas through the setting, admitting air to burn it in the waste-gas flues. With a fuel figure of 11.25% the steam raised per lb. of fuel was increased to 5.02 lb. from and at 212° F.

The high efficiency of the producer as indicated by the graphs showing $CO_2$ content, together with the efficiency gained by the centre central uptake in the setting, is responsible for the low fuel figures obtained.

The following is a summary of a complete set of observations of the performance of the new retort bench, taken over a 5 days' period, from July 8-12, 1939:

| | |
|---|---|
| Coal carbonized ... ... ... ... ... | 207.8 tons. |
| Average ash plus moisture ... ... ... | 14.19% |
| Gas made (corrected) ... ... ... ... | 3,762,000 cub. ft. |
| Gas made per ton of coal ... ... ... | 18,104 cub. ft. |
| Average calorific value ... ... ... ... | 450.76 B.Th.U. (gross). |
| Therms per ton ... ... ... ... ... | 81.60 |
| Gas made per ton corrected to standard coal of 8% ash plus moisture ... ... ... ... | 19,410 cub. ft. 87.46 therms. |
| Coke made per ton of coal ... ... ... | 11.22 cwt. |
| Coke to producers (gross) ... ... ... | 10.22% |
| Coke for sale per ton of coal ... ... ... | 9.2 cwt. |

## Benzole Plant

Investigation of the costs involved and estimation of the likely revenue showed there was a theoretical margin of profit to be derived from benzole recovery. A number of contractors were therefore invited to tender to a specification and to submit their anticipated balance sheets, all on the same basic figures.

The maximum daily make was 1¼ million cu.ft. of gas per day, and a plant to recover 1 gallon per ton from 2½ million cu.ft. per day and 2 gallons per ton from half maximum throughput was installed and located between the purifiers and station meter prior to the gasholder.

It was specified that the back pressure on the static washer should be a minimum, as the holder throws 14 in. W.G., and the purifier lutes have only 22 in. W.G. seal. A figure of 0.35 in. W.G. was guaranteed, the washer being filled with fibre brushes.

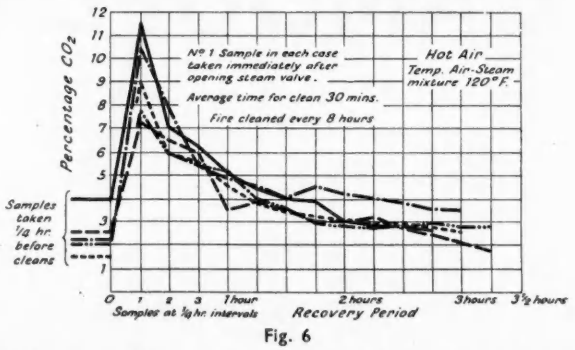
The design of the plant follows Messrs. Holmes' latest practice. Live steam is used to preheat the oil before entering the still, and exhaust steam from the vertical high-speed engine which drives the sextuple monobloc oil pumps is used in the still, thus economising in live steam. The gas oil and benzole storage tanks were sunk below ground level to conform to A.R.P. requirements and for general safety reasons.

By arranging a high and low run-off in the washer sludge trough the water/oil emulsion is allowed to settle and the oil recovered, thus reducing the loss which has proved to be from 5% to 7% of benzole made. Ordinary gas oil is used with a good recovery efficiency, and so far no sludging troubles have been experienced.

The guarantee tests carried out by the Contractors in November (cold weather and conducive to favourable results), and recent tests carried out by my staff in June (during a heat wave and not favouring a good return) may be of interest in showing the performance of the plant in extreme temperature conditions:

| | Nov., 1938. | June, 1939. |
|---|---|---|
| Atmospheric temperature max./min. °F. (shade) | 41/37 | 72/44 |
| Gas inlet temperature °F. ... ... ... | 54 | 58 |
| Gas outlet " °F. ... ... ... | 53 | 68 |
| Oil to washer °F. ... ... ... | 53 | 70 |
| Oil to Still °C. ... ... ... | 138 | 113 |
| Oil circulation, gall. per hour ... ... ... | 295 | 320 |
| Steam to still, lb. per sq. in. ... ... ... | 6.5 | 12 |
| Fractionating Column °C. ... ... ... | 87 | 94 |
| Gas make per day, million cu. ft. ... ... | 1.49 | 1.14 |
| Coal carbonised, tons per day ... ... ... | 92 | 77 |
| Benzole made per day, gall. ... ... ... | 217 | 181 |
| " " " ton of coal ... ... | 2.36 | 2.36 |
| " quality per cent. at 120° C. ... ... | 70 | 70 |
| " in gas, gall. per ton. ... ... ... | 3.21 | 2.94 |
| " efficiency recovery per cent. ... | 71 | 77 |
| Total steam used per gall. benzole, lb. ... ... | 43 (inc. 11 exhaust). | 52 (inc. 20 exhaust). |
| " water used per gall. benzole, gall. ... | 16 (towns) | 49 (river). |

Naphtha was recovered in the first instance, but the quality was not such as command a remunerative price, and it was thereafter returned to the washer. A hydrocarbon recovery

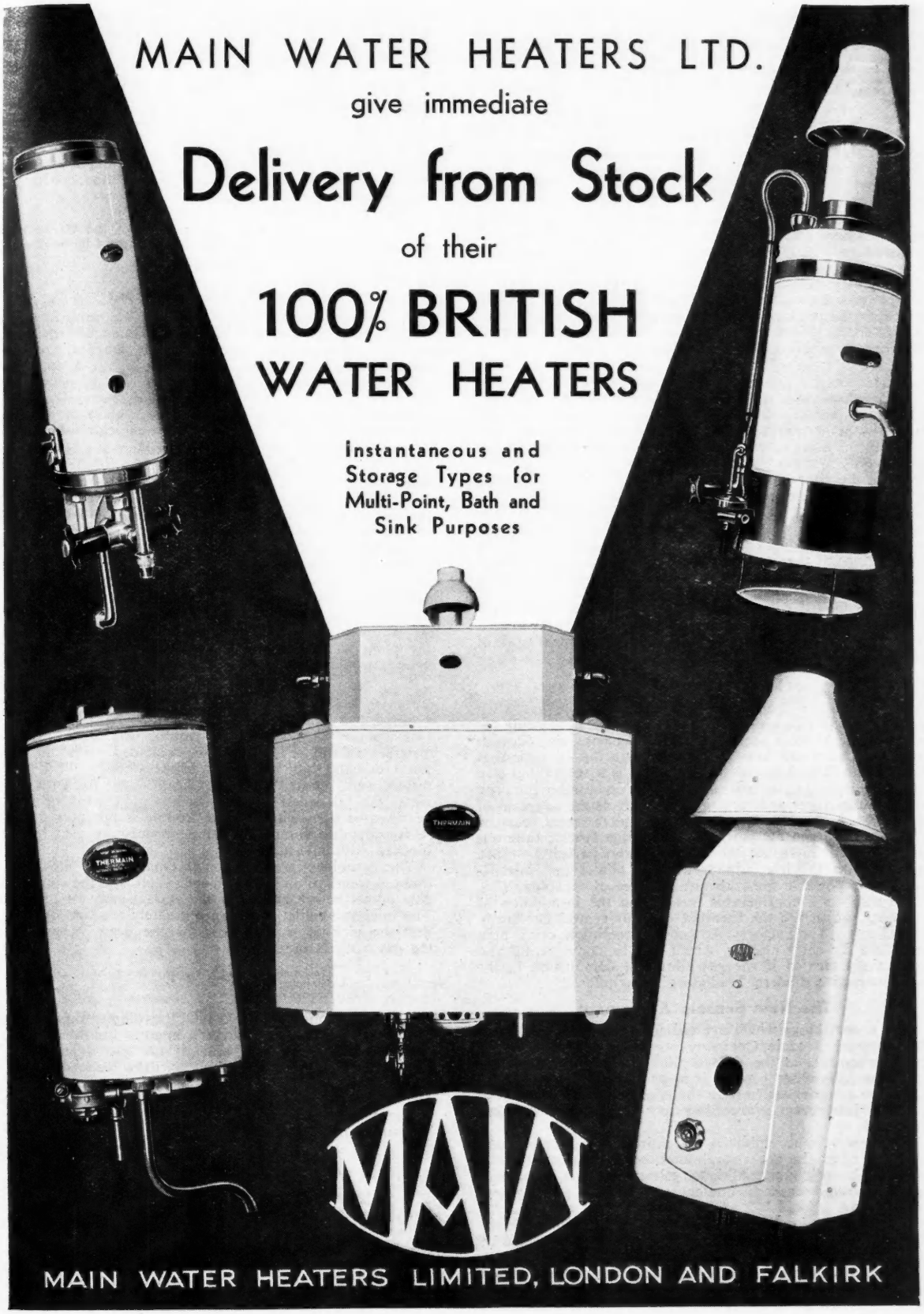

Percentage $CO_2$
No 1 Sample in each case taken immediately after opening steam valve.
Hot Air Temp. Air-Steam mixture 120° F.
Average time for clean 30 mins.
Fire cleaned every 8 hours
Samples taken ½ hr. before cleans
Samples at ½ hr. intervals
Recovery Period
1 hour
2 hours
3 hours
3½ hours
Fig. 6

efficiency of 93% was obtained in the November tests when the 0.5 gall. of naphtha recovered per ton is taken into consideration.

The financial results over the first six months of working show a net profit of £1,206.

A comparative statement showing the results at Perth before and after the installation of the benzole plant may serve as an indication of its effect on the revenue account. Actual quantities are used with net cost of residuals and gross expenditures.

| Period January 15 to May 15 | 1938 No benzole recovery. | 1939. Benzole recovery. |
|---|---|---|
| Gas made (corrected cu. ft.) ... | 158,385,000 | 167,033,000 |
| Gas made per ton (cu. ft.) ... | 18,134 | 16,079 |
| Gas loss per ton (cu. ft.) ... ... | | 2,055 = 9.25 therms |
| Coal carbonized (tons) ... ... | 8,734 | 10,388 |
| " " (do.) increase ... | | 1,654 |
| " " % " ... ... | | 19 |
| " " % " due to lower make per ton | | 13 |


MAIN WATER HEATERS LTD.
give immediate
Delivery from Stock
of their
100% BRITISH
WATER HEATERS
Instantaneous and
Storage Types for
Multi-Point, Bath and
Sink Purposes
THERMAIN
MAIN
MAIN WATER HEATERS LIMITED, LONDON AND FALKIRK

| Additional Expenditures. | £ |
|---|---|
| Coal, 1,654 tons at 22/3 ... | 1,840 |
| Gas oil, 1,270 gall. at 6d. ... | 32 |
| Boiler fuel, 200 tons at 20/- ... | 200 |
| Carbonizing plant maintenance, 1,654 tons at 9d. ... ... | 62 |
| Water (estimated) ... ... | 10 |
| Labour ... ... ... | 37 |
| | £2,181 |

| Additional Revenue. | £ |
|---|---|
| Benzole, 24,626 gall. at 8¼d. ... | 900 |
| Coke, 1,654 × 8.5 cwts. = 703 tons at 20s. ... ... ... | 703 |
| Tar, 1,654 × 17.75 galls. = 29,358 galls. at 2d. ... ... | 245 |
| S/A, 1,654 × 24 lbs. = 18 tons at 25s. ... ... ... | 22 |
| Gas, 8,648,000 cu. ft. at 2/6 per 1,000 cu. ft. (estimated) ... | 1,081 |
| | £2,951 |
| *Less* additional expenditures ... | 2,181 |
| Nett additional profit for four months ... ... ... | £770 |

On twelve months working the net additional profit will be approximately £2,300. The capital cost of the plant was approximately £3,000, so that it will be paid off within 1½ years.

My policy now is to recover the maximum quantity of benzole practicable, the limit at Perth apparently being determined by the minimum quantity of steam which can be used in the vertical retorts without discharging coke liable to fire in the bunkers or overheating the bottom castings.

## Coke

As for disposal of the increased quantity of coke produced, no serious difficulty has arisen, as the quality is such as commands a good market both at home and abroad. Every endeavour is being made to continue this improvement, first by buying only low ash coals, and secondly, by grading and debreezing the coke. The domestic market is being cultivated by the gas-ignited coke fire, which has great possibilities if the fuel is right. One of these fires was used to heat the lower saloon of the showroom last winter, and a small display cabinet with various grades of coke fitted alongside. The performance of the fire was our best salesman, and a gratifying number have been fitted, with many complimentary comments after use.

The gas-ignited coke fire is unique in that it represents a potential load builder for both gas and coke. From my experience it may be expected to use 50 cwt. coke and 5,000 cu.ft. of gas per annum in normal working.

## Sulphur

The contingent drop in sulphur content of the gas when washing for benzole must be a strong factor in influencing the adopting of benzole recovery plant. Fortunately, Scottish coals are relatively low in sulphur, but the reduction at Perth from 12 to 7 grains per 100 cu.ft. is a substantial step towards eliminating the evil effects of this undesirable impurity on both appliances and comfort, especially as the adoption of the flueless heater has been forced upon us in recent years by the steady demand for portable fires. Free flexible tubing is given in Perth to reduce the nuisance from porosity. This, coupled with the low sulphur content, allows the installation of the portable fire with a fair degree of satisfaction.

We also do a considerable business in the installation of radiators, which are the cheapest form of central heating in capital cost. The Factories Act, now in operation, opens up a new field for shop heating, which can be conveniently and successfully tackled if the gas allows of combustion in the many attractive modern "radiators" now offered.

## The New Benzole Agreement

The undertakings which are selling their crude benzole to the National Benzole Company are being asked to renew their agreements at the end of this year. Under this new agreement, the crude benzole is to be assessed on a different and more comprehensive basis the effect of which, may mean more or less revenue, according to the quality of benzole produced.

The new scheme embodies an entirely new fractionation test, and bases the actual evaluation on the potential yields of motor benzole (and additional solvent naphtha if present), taking also the wash oil content and sulphur grading into account.

Furthermore, low-gravity benzole is evaluated as being composed of a percentage of benzole, plus a percentage of petrol and relevant prices are applied. It will be seen therefore that there is no connection between the new evaluation and the existing retort evaluation, which is based on the percentage distillation at 120° C. The new test is much more scientific and is logical in its investigations of the quality. Low sulphur content is given due credit, and here most Scottish producers should benefit and qualify for the top grade, due to the low sulphur content of our local coals. The actual yields assessed are multiplied by the interim prices of the various distillates, to give the price payable per gallon, and adjustments to realized prices are made at the end of the year.

In order to produce a benzole to rank in the highest category it may be possible to modify the technique of carbonizing in relation to coals used, heat zoning and cracking, and the method of sulphur removal. Such steps are at least worthy of consideration.

From preliminary comparisons made of the crude benzole produced at Perth, the new assessment should be to our credit to the extent of ¼d. to ½d. per gallon.

## Gas Dehydration Plant

A "Dri-Gas" plant was installed at the same time as the benzole plant. The static washer is positioned after the benzole washer. Calcium chloride solution is the dehydrating medium. Exhaust steam from the reciprocating pump, augmented by that from two other engines nearby, is used to evaporate the moisture picked up from the gas. This extra steam allows of quicker evaporation, and therefore a more closer control of the specific gravity of the calcium chloride solution.

It was specified that the rack coolers for both benzole and "Dri-Gas" plants should be capable of operation with river water up to 70° F., and both plants came through the summer with flying colours. At the other extreme, during prolonged frosts, the pipe carrying the benzole from the plant to the storage tank actually froze on a few occasions. It has been re-laid in proximity to a steam range to avoid this trouble in future.

The specific gravity of the $CaCl_2$ solution must be kept safely below the minimum night temperature to avoid crystallization. The flow gauge has solidified on a few occasions by reason of its exposure. The policy has been to operate the plant to extract the maximum moisture so that the district would dry out more quickly.

## District Troubles

Some two or three months after the benzole and "Dri-Gas" plants were started up trouble was experienced with meters gumming. The trouble coincided with the maximum demand and minimum temperatures. 75% of the meters were relieved by an application, *in situ*, of a special meter oil, but whether this will prove a remedy or not will be revealed next winter. The trouble is not now apparent. A considerable number of lamp services are also becoming blocked with internal rust.

The gasholders were filmed internally with one-eighth to three-sixteenth of an inch of a special oil, and the comparative dew points before and after the storage may be of interest. The inlet and outlet pipes unfortunately are side by side, so that the pick-up is influenced by the draw as well as by the gas temperature.

Maximum pick-up, 9° F. rise in dew point.
Minimum pick-up, 0.5° F. " "
Average pick-up, 4.0° F. " "

The gas examiner has a G.L.C. hygrometer similar to that used on the works, so that credit is given for the removal of moisture in the calorific value of the gas. The plant has not been running long enough to draw conclusions as to reduction in complaints, but it is anticipated that it will help gas flow in sunken lead services and badly laid mains.

The performance of the plant in winter and summer can be gauged from the following test results:

| 1938. | CaCl2 Inlet. | CaCl2 Strength. | Gas Inlet. | Dew Point. | Minimum Atmo. temp. | H2O Removed. |
|---|---|---|---|---|---|---|
| Nov., 17 ... | 59° F. | 69° Tw. | 59° F. | 41.3° F. | 47° F. | 45% |
| " 18 ... | 61 | 69 | 59 | 41.1 | 42 | 50 |
| " 20 ... | 55 | 65.5 | 55 | 37.9 | 40 | 48 |
| " 21 ... | 57 | 71 | 56 | 36.4 | 34 | 53 |
| " 22 ... | 55 | 69 | 54 | 36.3 | 29 | 49 |
| " 23 ... | 55 | 69 | 50 | 36.0 | 36 | 43 |
| " 24 ... | 55 | 69 | 53 | 34.5 | 36 | 51 |
| 1939. | | | | | | |
| June 12 ... | 59° F. | 74° Tw. | 68° F. | 37.3° F. | 43° F. | 69% |
| " 13 ... | 60 | 74.5 | 69 | 42.2 | 43 | 63 |
| " 14 ... | 60 | 75 | 65 | 38.5 | 42 | 62 |
| " 15 ... | 62 | 74.5 | 70 | 39.9 | 44 | 67 |
| " 16 ... | 66 | 75 | 68 | 43.8 | 53 | 59 |

### Gas Charges

The prepayment consumer in Perth pays 9.11d. per therm and the ordinary 8.67d. per therm for the first 67.5 therms per annum, after which both drop to 7.11d. per therm for all further consumptions. I do not see why the prepayment consumer (who is now in the majority) should continue to pay a premium on all gas burnt as all receive the same service. They now virtually pay 2s. 6d. per annum more than the ordinary consumer. The policy which I hope to pursue is that of lowering the second rate to the minimum.

### General Results

The general results during the three years under consideration have been:

| Year. | Gas Sales (therms). | Consumers. | Appliance Sales. | Average Price. per therm | Sales per Consumer. Gas. Therms | Sales per Consumer. Appliances |
|---|---|---|---|---|---|---|
| 1936/7 | 1,710,236 | 13,003 | £9,200 | 7.68d. | 132 | 14/- |
| 1937/8 | 1,811,328 | 13,315 | £13,299 | 7.97d. | 136 | 20/- |
| 1938/9 | 1,847,988 | 13,661 | £12,842 | 7.79d. | 135 | 18/9 |

In our profession we have the great privilege of serving the public, in bringing to them the comforts and conveniences which the science of our industrious forefathers have handed on to us. Honour is being paid to our great brother Scot, William Murdoch, in this the centenary year of his death. The greatest honour which we can pay to him is to carry on the work which he set in being.

## Severn Valley Cooker Competition

It is always difficult to assert with certainty what effect any particular kind of publicity has upon public opinion, but an analysis of the numerous entries received in the Gas Cooker Competition recently organized by Severn Valley and Gas Consolidation, Ltd., leads one to believe that an oft-repeated slogan can influence people.

The following "Outstanding Features of the New Gas Cookers" had to be placed in their order of importance and reasons given for placing number one as the most important advantage.

Beside each "feature" is shown the percentage of the total entrants who selected it as the most important.

| | Public Vote. |
|---|---|
| 1. Reliability ... ... ... ... ... | 62.5% |
| 2. Economy in gas consumption ... ... | 13.1% |
| 3. Automatic oven with cookery book ... | 10.7% |
| 4. Easy-to-clean enamel finish ... ... ... | 5.3% |
| 5. Modern design, including folding cover ... | 3.6% |
| 6. Super-speed boiling burners ... ... | 3.0% |
| 7. Bright colourful appearance ... ... | 1.2% |
| 8. High-speed griller ... ... ... ... | 0.6% |

Slogans such as "Gas Never Fails," "Gas—The Unfailing Service," "You Can Rely on Gas," and "Gas to be Sure" are in regular use in publicity matter and on vehicles used by the Controlled Companies, and these have, it is believed, played an important part in bringing home to the public the fact that reliability should be their first consideration when choosing a cooker. The 62.5% entrants who placed "Reliability" first were most emphatic in their reasons for doing so.

Consolation prizes were awarded for the best entries received by each of the Controlled Companies, and the first prize of £50 was divided equally between the following six ladies, who submitted all-correct solutions:

| | |
|---|---|
| Mrs. E. Clayton ... ... ... | Leominster. |
| Mrs. Dorothy Mary Davies ... | Shrewsbury |
| Mrs. W. A. Gold ... ... ... | Cheadle |
| Miss Valerie Grist ... ... ... | Winchcombe |
| Mrs. A. M. Moody ... ... ... | Gloucester |
| Mrs. H. B. Stephens ... ... ... | Churchdown |

The first two of the following "Reasons" were given by prize winners, while the verses were written by an elderly Dean of a Cathedral:

1. "I have chosen "Reliability" as my first choice because, in my opinion, without "Reliability" all the other outstanding features would be of no avail."
2. "Vain would be every attraction of design, and fascinating appearance; deceptive the promise of speed in boiling and grilling; useless the ease in cleaning; false the economy; merely exasperating the automatic oven inviting experiments from the cookery book with its appetising recipes, without the serene assurance of reliability, which transforms cooking from anxious drudgery to satisfying creative activity."
3. "Of all ability—Reliability,
   And though this cooker may give speed,
   If you can't depend on it,
   There will be an 'end on it,'
   For it may fail you in your hour of need.

   Seven more attractions,
   Offering satisfactions,
   In this cooker you will find.
   But your wisest plan,
   Be you woman or 'mere man,'
   Is Keep Reliability in Mind."

## Gas Has Important Role in Public Health Tests

Gas plays an important part in guarding the health of the American citizens. Samples and cultures sent to State health departments by physicians and health officers have to be tested and analyzed to detect the presence of disease-carrying bacteria. Gas is employed in no fewer than seventeen different processes carried out in chemistry and physics, in microbiology and in serology, reports the New Jersey Public Utility Information Committee.

Water, milk, ice, sewage, river water, and trade wastes have to be tested for the presence of germs that may produce typhoid, pneumonia, venereal, and many other communicable diseases. A steady bunsen burner gas flame has been found most efficient for heating solutions, for drying, for sterilizing and scores of other operations that require an exact heat to make the tests accurate.

## Courses in Industrial Metallurgy

The Head of the Department of Metallurgy, Battersea Polytechnic, Battersea Park Road, S.W.11, has asked for attention to be called to a special course of lectures specially arranged to meet the needs of: (i) Technical Representatives; (ii) Salesmen; (iii) Inspection Officers; and (iv) all those working, machining, or otherwise dealing with metallic articles.

The course of 24 lectures, commencing Oct. 17, includes: Metallurgical terms; manufacture and properties of industrial metals and alloys; wrought iron, cast iron, malleablized iron, steel; industrial fabrication processes, founding, stamping, rolling, extrusion; defects in metals; corrosion, industrial pyrometry, mechanical testing; specifications, galvanizing, and electro deposition; heat treatment of carbon and alloy steels.

There is also available in connexion with these lectures: Practical work in the details of the more important applications to industry (technical salesmanship is considered). Practical instruction, consisting of heat treatment, testing, and microstructure of metals, is directed towards the immediate technical needs of the individual students.

## Trade News

### Gas Producers for Transport

The Brush Electrical Engineering Co., Ltd., of Loughborough, has acquired the patents of the "Koela" gas-producer, and already extensive plans are in operation for rapid manufacture and quick delivery.

### Chemical Engineering's New Home

A visit was paid last week by a "JOURNAL" representative to the war-time quarters of the Chemical Engineering and Wilton's Patent Furnace Co., Ltd., at "The Old House," London Road, Horsham, where *all* departments of the Company are now working. In the space of a few weeks "The Old House" has been converted into convenient and commodious offices, where each department is comfortably housed in pleasant surroundings. Periodically Mr. T. O. Wilton visits the Company's old Victoria Street quarters with a view to facilitating personal contacts.

# THE FIVE POINTS..

**SMITH METERS LIMITED,**

*Head Office and Works:*

**186, KENNINGTON PARK RD., LONDON, S.E.11.** *Tel: RELIANCE 2447-8-9* *'Grams: Smieters, Lamb, London.*

3-4, EAST PARADE, LEEDS, 1. Telephone: LEEDS 23726

# Markets and Manufactures

## Current Sales of Gas Products

### The London Market

Oct. 16.

There are no changes to report in the London tar products market, to-day's values being as under:

Pitch, 30s. per ton f.o.b.
Creosote about 5d. per gallon.
Refined tar 3¾d. to 4d.
Pure Toluole is nominal at 2s. 6d. to 2s. 7d.
Pure benzole about 1s. 9d.
Solvent naphtha about 1s. 10d.
Pyridine 90/160 14s. to 14s. 6d.
All per gallon naked.
Refined naphthalene crystals are about £15 per ton in bags.
All prices are *ex* makers' works.

### The Provinces

Oct. 16.

Crude Gas-Works Tar, 10s. to 15s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 25s. to 27s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 25s. to 27s.* Toluole, naked, North, 1s. 10d. to 1s. 11d. Coal tar, crude naphtha, in bulk, North 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4¼d. to 1s. 5d. Heavy naphtha, North, 1s. 2¼d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 3⅝d. to 4¼d.; low gravity, 4d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal, "B" quality unsaleable. Heavy oil: Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5¼d. to 5½d.; heavy tar oil, gr. less than 1,080, 4¼d. to 4½d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls, whatever they may be.

### Scotland

GLASGOW, Oct. 14.

Trading during the week has been on a moderate but steady scale and no material alteration has taken place in values.

**Crude gas-works tar.**—Actual value is about 30s. to 32s. per ton *ex* works in bulk, but no supplies are available in the form of spot lots.

**Pitch** of vertical quality is unchanged at 24s. to 25s. per ton, f.o.b. for export, and round 20s. to 22s. 6d. per ton *ex* works in bulk for home trade.

**Refined tar** is available in the home market at 3¾d. to 4d. per gallon, and for export at 2¼d. to 3d. per gallon, into buyers' packages at makers' works.

**Creosote oil.**—Market is quietly steady with makers' prices approximately as under: Specification oil, 4d. to 4¼d. per gallon; low gravity, 4¾d. to 5d. per gallon; neutral oil, 4¼d. to 4½d. per gallon; all *ex* works in bulk.

**Cresylic acid.**—A moderate business is being effected in all grades and to-day's prices are approximately as follows: Pale, 97/99%, 1s. 11d. to 2s. 2d. per gallon; Dark, 97/99%, 1s. 10d. to 2s. per gallon; Pale, 99/100%, 2s. 4d. to 2s. 7d. per gallon; all *ex* works in buyers' packages.

**Crude naphtha** shows no alteration at 5d. to 5½d. per gallon *ex* works in bulk, according to quality.

**Solvent naphtha** is 1s. 5d. to 1s. 6d. per gallon for 90/160 grade and 1s. 2d. to 1s. 3d. per gallon for 90/190 heavy naphtha.

**Motor benzole** shows no alteration at 1s. 3d. to 1s. 4d. per gallon.

**Pyridine** is nominal at 12s. to 13s. per gallon for 90/160 grade and 14s. to 15s. per gallon for 90/140 grade.

## Flexible Tubing for Transport

We have received from the Compoflex Co., Ltd., of Speke Road, Battersea, a small sample of their patent "Compoflex" flexible tubing, which has a particular application to gas propelled motor vehicles which are now being developed. The tubing consists of two windings of steel wire between which is interwoven several layers of viscose paper, known commercially as "Rayophane," backed with kraft paper. This construction makes for great flexibility, and at the same time it is strong and unkinkable. The "Rayophane" lining is not affected by the chemical constituents in town gas and is impervious to it. In the larger sizes particularly, the tubing is lighter than ordinary flexible tubing, and owing to the wire spirals, heat generated at any one point is dissipated quickly along the length of tubing. Longer life is assured owing to the construction being partly metallic. "Compoflex" tubing is made in sizes ranging from $\frac{5}{16}$ths in. bore upwards, and the Compoflex Co., Ltd., of which Mr. R. B. McLeod is sales manager, are the sole manufacturers.

B.S/A.R.P.2
BITUMINOUS PAINT FOR STEELWORK

METROTECT

a bituminous paint conforming to the above specification, and producing a pleasant satin black finish with highly waterproof and anti-corrosive properties.

Protects steel-work which is continuously immersed in water. Does not "crocodile" on prolonged atmospheric exposure. METROTECT flows freely under the brush and can be applied quickly and without effort even in cold weather.

ALSO AN EXCELLENT BLACK-OUT PAINT FOR WINDOWS AND SKY-LIGHTS.

Prices and further particulars from—

SOUTH METROPOLITAN GAS CO.

REGIS HOUSE,
KING WILLIAM STREET,
E.C.4.

Telephone: AVENUE 2755.

# W E S T ' S

## *in Wartime*

THROUGH the medium of our advertisements we offer this early indication of our policy in the light of existing conditions.

Our friends throughout the Gas Industry are assured that their interests will remain as important to this company as hitherto. Such interruption of normal industrial activities as must occur will not affect our desire to be consulted on all questions relating to the operation of West's Carbonizing Plants. We have complete confidence in the ability of these plants to meet the demands of the future, and a keen sense of the necessity to maintain them at a high level of efficiency. Our resources will be ready during the months ahead to assist the Gas Engineers in this vital responsibility whenever the occasion arises.

**WEST'S GAS IMPROVEMENT COMPANY, LTD.,**
**MILES PLATTING · MANCHESTER 10**

# WEST'S
# CARBONIZING
# PLANTS

**GLOVER-WEST VERTICAL RETORTS ● WEST VERTICAL CARBONIZING CHAMBERS**

# GAS STOCKS AND SHARES

Business on the Stock Exchange last week continued on normal lines, and a feature was the demand for high-class debenture stocks. This will assist the resumption of business in British Funds generally, in fact dealings in War Loan have already commenced and this stock closed 7s. 6d. above the fixed minimum. Home rails remained steady. Considerable improvement took place in a number of industrial shares, particularly those of iron and steel, aircraft, and multiple shops, and some prices are now higher than just prior to the outbreak of war. There were signs of increased business in mining shares, and oils were bright on rumours of an increase in the price of petrol. Rubber shares were also assisted by a rise in the price of the commodity. Mr. Chamberlain's speech received unanimous approval and was responsible for a firm close.

The volume of business in the Gas Market still remains very small, and is confined for the most part to forced sales. It is only natural that when on enquiry a price is offered anything from 20 to 40 points lower than the existing quotation any would-be sellers have decided to wait for better times. The offer having been made, however, is sufficient to affect the market quotation accordingly. That some demand exists is evidenced by the further rise of 1s. in Gas Light units to 15s. 6d. Unfortunately the downward trend elsewhere still persists and a number of heavy falls occurred again last week. These included a drop of 47 points in Bournemouth sliding scale stock and 25 in the company's 7% maximum stock. Malta and Mediterranean fell 30½ to par and Mid-Southern Utility consolidated closed 15½ points lower at 80. It will be seen in the list below that a number of other stocks lost anything up to 10 points.

At the Provincial Exchanges the only alteration of note was a further drop of 5 in Sheffield consolidated, while in the Supplementary List nominal quotations closed unchanged.

## Official Quotations on the London Stock Exchange

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 1,767,439 | Sept. 4 | 8 | 8 | Alliance & Dublin Ord. ... | 105—115 | ... |
| 374,000 | June 19 | 4 | 4 | Do. 4 p.c. Deb. ... | 80—90 | ... |
| 877,576 | May 8 | 5 | 5 | Asscd. Gas & Water U'd'ts Ord. | 15/—17/– | ... |
| 500,000 | ,, | 4½ | 4½ | Do. 4½ p.c. Red. Cum. Pref. | 18/6—20/6 | ... |
| 535,545 | ,, | 4 | 4 | Do. 4 p.c. Red. Cum. Pref. | 16/—18/– | ... |
| 318,730 | ,, | 4 | 4 | Do. 4 p.c. Irred. Cum. Pref. | 15/—17/– | ... |
| 750,000 | Sept. 18 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 80—90 | ... |
| 560,070 | Aug. 21 | 7 | 7 | Barnet Ord. 7 p.c. ... ... | 110—130 | –5 |
| 300,000 | Oct. 9 | 1/9⅜ | 1/4⅜ | Bombay, Ltd. ... ... ... | 18/—20/–* | –1/– |
| 181,185 | Aug. 21 | 9½ | 9½ | Bournemouth Sliding Scale ... | 130—150 | –47 |
| 690,526 | ,, | 7 | 7 | Do. 7 p.c. max. ... | 110—130 | –25 |
| 493,960 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... | 122—127 | ... |
| 50,000 | June 5 | 3 | 3 | Do. 3 p.c. Deb. ... | 70—75 | ... |
| 362,025 | ,, | 4 | 4 | Do. 4 p.c. Deb. ... | 93—98 | ... |
| 335,000 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 110—115 | ... |
| 357,900 | Aug. 21 | 7½ | 7½ | Brighton, &c., 6 p.c. Con. ... | 110—120 | ... |
| 659,955 | ,, | 6⅜ | 6⅜ | Do. 5 p.c. Con. ... | 100—105 | ... |
| 205,500 | ,, | 6 | 6 | Do. 6 p.c. 'B' Pref. ... | 108—113 | ... |
| 855,000 | Sept. 18 | 8 | 7 | British Ord. ... ... ... | 95—105 | ... |
| 100,000 | June 19 | 7 | 7 | Do. 7 p.c. Pref. ... ... | 136—141 | ... |
| 350,000 | ,, | 5½ | 5½ | Do. 5½ p.c. 'B' Cum. Pref. | 110—115 | ... |
| 120,000 | June 5 | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 92—97 | ... |
| 450,000 | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 100—105 | ... |
| 450,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 89—94 | ... |
| 100,000 | 22 May '33 | 6 | 4 | Cape Town, Ltd. ... ... | ¼—¾ | ... |
| 100,000 | 6 Nov. '33 | 4½ | 4½ | Do. 4½ p.c. Pref. ... ... | ¼—¾ | ... |
| 150,000 | June 19 | 4½ | 4½ | Do. 4½ p.c. Deb. ... ... | 58—68 | ... |
| 626,860 | July 17 | 6 | 6 | Cardiff Con. Ord. ... ... | 95—105 | ... |
| 237,860 | June 5 | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 102—107 | ... |
| 98,936 | Oct. 9 | 2/– | 2/– | Colombo Ord. ... ... ... | 1⅛—1⅜* | –⅛ |
| 24,510 | ,, | 1/4⅜ | 1/4⅜ | Do. 7 p.c. Pref. ... ... | 20/6—22/6* | –/6 |
| 739,453 | Sept. 27 | –/11.48 | –/11.48 | Colonial Gas Assn. Ltd. Ord. ... | 15/6—17/6 | ... |
| 296,144 | ,, | 1/3.30 | 1/3.30 | Do. 8 p.c. Pref. ... ... | 20/6—22/6 | ... |
| 1,775,005 | July 31 | 4 | 4 | Commercial Ord. ... ... | 47—52 | ... |
| 140,000 | Aug. 21 | 4 | 4 | Do. 4 p.c. Red. Pref. ... | 90—95 | ... |
| 620,000 | June 5 | 3 | 3 | Do. 3 p.c. Deb. ... ... | 55—60 | ... |
| 286,344 | Aug. 21 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 85—95 | ... |
| 200,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 94— 99 | ... |
| 807,560 | July 31 | 7 | 7 | Croydon sliding scale ... | 100—110 | ... |
| 644,590 | ,, | 5 | 5 | Do. max. div. ... ... | 80—85 | ... |
| 620,385 | June 19 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 90—100 | ... |
| 208,660 | Aug. 21 | 5 | 5 | Dudley, Brierley Hill & Dist. Ord. | 100—105 | ... |
| 82,275 | ,, | 5 | 5 | Do. 5 p.c. Con. Pref. ... | 75—80 | ... |
| 79,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 94—99 | ... |
| 239,000 | July 31 | 5 | 5 | East Hull Ord. 5 p.c. ... ... | 86—91 | ... |
| 187,215 | Aug. 21 | 6 | 5½ | East Surrey Ord. 5 p.c. ... | 98—103 | ... |
| 176,211 | June 5 | 5 | 5 | Do. 5 p.c. Deb. ... | 105—110 | ... |
| 250,000 | July 3 | 4 | 8 | Gas Consolidation Ord. 'B' ... | 18/6—20/6 | ... |
| 250,000 | May 22 | 4 | 4 | Do. 4 p.c. Red. Cum. Pref. | 17/—19/– | ... |
| 9,172,463 | July 31 | 5⅝ | 5⅝ | Gas Light & Coke Ord. ... | 14/6—16/6a | +1/– |
| 2,600,000 | ,, | 3½ | 3½ | Do. 3½ p.c. max. ... ... | 53—58 | +1 |
| 4,477,106 | ,, | 4 | 4 | Do. 4 p.c. Con. Pref. ... | 70—80 | ... |
| 2,993,000 | July 3 | 3⅜ | 3⅜ | Do. 3⅜ p.c. Red. Pref. ... | 80—90 | ... |
| 8,602,497 | May 22 | 3 | 3 | Do. 3 p.c. Con. Deb. ... | 58—63 | ... |
| 3,642,770 | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 97—102 | ... |
| 1,500,000 | ,, | 4½ | 4½ | Do. 4½ p.c. Red. Deb. ... | 93—98 | +1 |
| 700,000 | Sept. 4 | 3½ | 3½ | Do. 3½ p.c. Red. Ded. ... | 85—95 | ... |
| 270,466 | July 31 | 6 | 6 | Harrogate New Cons. ... ... | 95—100 | ... |
| 157,500 | Mar. 20 | ‡1/– | ‡1/– | Hong Kong and China Ord. ... | ⅛—⅜ | –⅛ |
| 5,600,000 | May 8 | 8 | 12 | Imperial Continental Cap. ... | 72—82 | –3 |
| 172,810 | July 31 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 85—95 | ... |
| 63,480 | June 19 | 3 | 3 | Maidstone 3 p.c. Deb. ... ... | 57—62 | ... |
| 45,000 | May 22 | †10 | †10 | Malta & Mediterranean ... | 95—105 | –30½ |
| | | | | Metropolitan (of Melbourne) ... | | |
| 392,000 | Oct. 2 | 5½ | 5½ | 5½ p.c. Red. Deb. ... ... | 95—100 | ... |
| 231,977 | Aug. 21 | 5 | 5 | M.S. Utility 'C' Cons. ... ... | 75—85 | –15½ |
| 968,658 | ,, | 4 | 4 | Do. 4 p.c. Cons. Pref. ... | 74—79 | –3 |
| 390,076 | June 19 | 4 | 4 | Do. 4 p.c. Deb. ... | 88—93 | ... |

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 148,955 | June 19 | 5 | 5 | M.S. Utility 5 p.c. Deb. ... | 90—100 | ... |
| 125,000 | July 3 | 3½ | 3½ | Do. 3½ p.c. Red. Bds. ... | 92—95 | ... |
| 675,000 | May 8 | †6 | †3 | Montevideo, Ltd. ... ... | 52—62 | ... |
| 250,000 | Aug. 21 | 7½ | 7½ | North Middlesex 6 p.c. Con. ... | 133—138 | ... |
| 396,160 | July 31 | 5 | 5 | Northampton 5 p.c. max. ... | 101—106 | ... |
| 300,000 | April 24 | †9 | †7 | Oriental, Ltd. ... ... ... | 125—135 | –10 |
| 468,537 | June 5 | 7 | 8 | Plymouth & Stonehouse 5 p.c. | 112—117 | ... |
| 621,667 | July 31 | 8½ | 8⅛ | Portsmouth & Gosport Cons. | 132—142 | ... |
| 241,446 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 95—100 | ... |
| ,, | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 90—100 | ... |
| ,, | ,, | 4 | 4 | Do. 4 p.c. Pref. ... ... | 77—82 | ... |
| 75,000 | ,, | 5 | 5 | Preston 5 p.c. Pref. ... ... | 90—100 | ... |
| 114,000 | July 31 | 5 | 5 | Primitiva 4 p.c. Cons. Deb. ... | 95—100 | ... |
| 247,966 | June 19 | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 93—98 | ... |
| 625,959 | July 17 | 4 | 4 | San Paulo 6 p.c. Cum. Pref. ... | 7½—8½ | ... |
| 15,000 | Sept. 4 | 6 | 6 | Severn Val. Gas Cor. Ld. Ord. | 16/—19/–* | ... |
| 441,275 | Oct. 9 | 1/1½ | 1/1½ | ,, ,, 4½ p.c. Cum. Pref. ... | 16/—18/– | ... |
| 460,810 | Oct. 2 | –/10⅜ | –/10⅜ | Shrewsbury 5 p.c. Ord. ... | 107—117 | ... |
| 133,201 | Aug. 21 | 5 | 8½ | South African Ord. ... ... | 4—5 | ... |
| 9,000 | June 5 | †4 | †4 | South East'n Gas Cn. Ld. Ord. | 16/—18/– | ... |
| 1,996,297 | Aug. 21 | 1/2⅜ | 1/2⅜ | Do. 4½ p.c. Red. Cum. Pref. | 18/—20/– | ... |
| 1,000,000 | ,, | –/10⅜ | –/10⅜ | Do. 4 p.c. Cum. Pref. ... | 15/—17/– | ... |
| 769,191 | ,, | 4 | 4 | Do. 4 p.c. Deb. ... ... | 95—100 | ... |
| 450,000 | ,, | 4 | 4 | Do. 3½ p.c. Red. Deb. ... | 90—95 | ... |
| 150,000 | ,, | 3½ | 3½ | South Met. Ord. ... ... | 50—70 | –5½ |
| 6,709,895 | July 31 | 6 | 5 | Do. 6 p.c. Irred. Pref. ... | 85—95 | ... |
| 1,135,812 | ,, | 6 | 6 | Do. 4 p.c. Irred. Pref. ... | 70—80 | ... |
| 850,000 | ,, | 4 | 4 | Do. 3 p.c. Deb. ... ... | 57—62 | ... |
| 1,895,445 | June 19 | 3 | 3 | Do. 5 p.c. Red. Deb. ... | 95—105 | ... |
| 1,000,000 | July 17 | 5 | 5 | Do. 3⅜ p.c. Red. Deb. ... | 92—97 | ... |
| 600,000 | ,, | 3⅜ | 3⅜ | South Suburban Ord. 5 p.c. ... | 65—75 | ... |
| 1,543,795 | July 31 | 6 | 6 | Do. 5 p.c. Pref. ... ... | 90—100 | ... |
| 512,925 | ,, | 5 | 5 | Do. 4 p.c. Pref. ... ... | 75—85 | ... |
| 500,000 | ,, | 4 | 4 | Do. 3⅜ p.c. Red. Pref. ... | 89—94 | ... |
| 250,000 | ,, | 3⅜ | 3⅜ | Do. 5 p.c. Deb. ... ... | 90—100 | ... |
| 888,587 | June 5 | 5 | 5 | Do. 4 p.c. Deb. ... ... | 89—94 | ... |
| 250,000 | ,, | 4 | 4 | Do. 3½ p.c. Red. Deb. ... | 89—94 | ... |
| 200,000 | July 31 | 3 | 3 | S. Western Gas & Water Ord. | 14/—16/– | ... |
| 427,859 | Sept. 18 | 1/2⅜ | 9⅜ | Do. 4½ p.c. Red. Cum. Pref. | 17/6—19/6* | –1/– |
| 160,523 | Oct. 9 | –/10⅜ | –/10⅜ | Do. 4 p.c. Red. Deb. ... | 92—97 | ... |
| 110,000 | June 5 | 4 | 4 | Southampton Ord. 5 p.c. ... | 75—85 | ... |
| 750,541 | July 31 | 5½ | 5 | Do. 4 p.c. Deb. ... | 80— 90 | ... |
| 148,836 | June 5 | 4 | 4 | Swansea 5½ p.c. Red. Pref. ... | 90—100 | ... |
| 350,000 | July 31 | 5½ | 5½ | Do. 3½ p.c. Red. Deb. ... | 90—100 | ... |
| 200,000 | June 19 | 3½ | 3½ | Tottenham and District Ord.... | 85—95 | ... |
| 1,076,490 | July 31 | 6⅜ | 6⅜ | Do. 5½ p.c. Pref. ... ... | 100—110 | ... |
| 409,835 | ,, | 5⅛ | 5⅛ | Do. 5 p.c. Pref. ... ... | 90—100 | ... |
| 62,235 | ,, | 5 | 5 | Do. 4 p.c. Deb. ... ... | 87—92 | ... |
| 453,380 | June 19 | 4 | 4 | Tuscan 6 p.c. Red. Deb. ... | 95—100 | ... |
| 85,701 | June 5 | 6 | 6 | U. Kingdom Gas Cor. Ord. ... | 14/—17/– | ... |
| 1,247,505 | May 8 | 4 | 6 | Do. 4½ p.c. 1st Cum. Pref. ... | 14/—17/– | ... |
| 1,085,952 | May 8 | 4½ | 4½ | Do. 4 p.c. 1st Red. Cum. Pf. | 15/—18/– | ... |
| 772,709 | ,, | 4 | 4 | Do. 4½ p.c. 2nd Non-Cum. Pf. | 13/6—15/6 | ... |
| 745,263 | June 5 | 4½ | 4½ | Do. 3½ p.c. Red. Deb. ... | 85—95 | ... |
| 1,093,656 | Sept 18 | 3½ | 3½ | Uxbridge, &c., 5 p.c. ... ... | 90—100 | –5 |
| 378,106 | Mar. 6 | 7 | 7 | Do. 5 p.c. Pref. ... ... | 90—100 | ... |
| 133,010 | ,, | 5 | 5 | Wandsworth Consolidated ... | 85—95 | ... |
| 1,371,138 | July 31 | 7 | 6½ | Do. 4 p.c. Pref. ... ... | 65—75 | –9½ |
| 2,525,768 | ,, | 4 | 4 | Do. 5 p.c. Deb. ... ... | 90—100 | ... |
| 1,343,964 | June 19 | 5 | 5 | Do. 4 p.c. Deb. ... ... | 75—85 | –11½ |
| 383,745 | ,, | 4 | 4 | Do. 3⅜ p.c. Red. Deb. ... | 92—97 | ... |
| 400,000 | ,, | 3⅜ | 3⅜ | Watford and St. Albans Ord. ... | 95—105 | ... |
| 558,342 | July 31 | 6⅜ | 6⅜ | Do. 5 p.c. Pref. ... ... | 90—100 | ... |
| 200,000 | ,, | 5 | 5 | Do. 5½ p.c. Pref. ... ... | 100—110 | ... |
| 200,000 | ,, | 5½ | 5½ | Do. 4 p.c. Rd. Pf. (1973/8) | 90—95 | ... |
| 200,000 | ,, | 4 | 4 | Do. 4 p.c. Red. Pf. (1959) | 97—102 | ... |
| 100,000 | — | — | — | Do. 4 p.c. Red. Deb. ... | 95—100 | ... |
| 200,000 | June 19 | 4 | 4 | Do. 3½ p.c. Red. Deb. ... | 83—88 | ... |
| 200,000 | ,, | 3½ | 3½ | | | |

*a*.—The quotation is per £1 of Stock. * Ex. Div. † Paid free of income-tax. ‡ For year. § Actual.

**Supplementary List and Provincial Exchanges overleaf.**

# STOCK AND SHARE LIST—Contd.

## Supplementary List, not Officially Quoted, London

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Nominal Quotations Oct. 13. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 202,152 | Sept. 4 | 5 | 5 | Ascot Ord. ... ... ... | 95—100 | .. |
| 128,182 | July 3 | 5 | 5 | Do. 5 p.c. Pref. ... ... | 101—106 | ... |
| 31,035 | Aug. 21 | -/4⅛ | -/4⅛ | Associated Utilities 4 p.c. Pref. | 15/—17/- | .. |
| 100,000 | June 19 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 93—98 | ... |
| 17,000 | Aug. 21 | 8 | 8 | Bognor Orig. Ord. 'A' ... | 137—147 | ... |
| 62,210 | ,, | 8 | 8 | Do. New Add. 'A' ... | 105—115 | ... |
| 87,160 | ,, | 7 | 7 | Do. New 7 p.c. max. ... | 100—110 | ... |
| 37,440 | July 31 | 10 | 10 | Cam. Univ. & Town 10 p.c. max. | 110—120 | ... |
| 125,970 | ,, | 7 | 7 | Do. 7 p.c. max. ... ... | 90—100 | ... |
| 39,025 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 80—90 | ... |
| 96,410 | July 17 | 4½ | 4½ | Cardiff 4½ p.c. Pref. ... ... | 92—97 | ... |
| 55,520 | July 31 | 6 | 6 | Colchester 6 p.c. Pref. ... ... | 113—118 | ... |
| 90,550 | Sept. 18 | 5 | 5 | Do. 5 p.c. Deb. ... | 100—105 | ... |
| 150,000 | July 31 | 4 | 4 | Croydon 4 p.c. Pref. ... ... | 84—89 | ... |
| 130,000 | June 19 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 90—95 | ... |
| 65,000 | Aug. 21 | 7½ | 7¼ | Eastbourne 'A' 5 p.c. ... ... | 120—130 | ... |
| 198,000 | ,, | 6 | 6 | Do. 'B' 3½ p.c. ... ... | 103—113 | ... |
| 112,312 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 100—105 | ... |
| 130,000 | June 19 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 105—110 | ... |
| 130,500 | Aug. 10 | 7½ | 7½ | Exeter New Ord. (£10) ... | 13½—15½ | ... |
| 24,000 | Aug. 21 | 8½ | 8½ | Gt. Yarmouth 8½ p.c. max. (£30) | 24—29 | ... |
| 59,400 | ,, | 7½ | 7½ | Do. 7½ p.c. max. (£30) ... | 26—31 | ... |
| 51,160 | June 5 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 115—120 | ... |
| 152,600 | Sept. 4 | 9 | 8 | Guildford Cons. ... ... | 145—155 | ... |
| 54,055 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 100—105 | ... |
| 68,250 | June 5 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 103—108 | ... |
| 156,600 | Aug. 21 | 7 | 7 | Hampton Court Cons. ... | 100—110 | ... |
| 86,046 | June 19 | ‡4½ | ‡5 | Holyh'd&N.W.G.&W.Cpn.Ord. | 13/6—15/6 | ... |
| 80,000 | Aug. 21 | 4 | 4 | Lea Bridge 4 p.c. Pref. ... ... | 78—83 | ... |
| 60,000 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... ... | 113—118 | ... |
| 94,876 | June 5 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 87—92 | ... |
| 73,620 | Sept. 18 | 8¾ | 8¾ | Luton Cons. 'A' ... ... ... | 150—160 | ... |
| 107,960 | Sept. 18 | 5½ | 4 | Mid Kent Ord. (£10) ... ... | 8—9 | ... |
| 230,940 | July 31 | 10 | 10 | Oxford & District Ord. ... | 145—155 | ... |
| 47,112 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 95—105 | ... |
| 50,000 | ,, | 6 | 6 | Do. 6 p.c. Red. Pref. ... | 106—111 | ... |
| 126,193 | May 8 | 7½ | 7½ | Peterborough Ord. ... ... | 134—139 | .. |
| 64,990 | Sept. 18 | 7½ | 7 | Redditch Ord. ... ... ... | 110—120 | ... |
| 166,850 | July 31 | 8 | 8 | Romford Ord. ... ... ... | 137—142 | ... |
| 60,000 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... ... | 95—100 | ... |
| 44,000 | Sept. 18 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 105—110 | ... |
| 25,570 | July 31 | 5¼ | 5½ | Rugby 5½ p.c. Pref. ... ... | 116—121 | ... |
| 25,000 | ,, | 6 | 6 | Do. 6 p.c. Red. Pref. ... | 103—108 | ... |
| 42,750 | June 5 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 113—118 | ... |
| 110,950 | Aug. 21 | 8 | 8 | Ryde Ord. ... ... ... | 137—147 | ... |
| 270,086 | Sept. 4 | 7 | 7 | Slough Ord. ... ... ... | 120—130 | ... |
| 21,000 | June 5 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 103—108 | ... |
| 28,872 | May 8 | 5½ | 5½ | S. Midland Gas Cpn. Ltd. Ord. | 16/—18/- | ... |
| 28,866 | Sept. 18 | 4½ | 4½ | Do. 4½ p.c. Red. Cum. Pref. | 16/6—18/6 | ... |
| 117,228 | Aug. 21 | 7 | 5 | Swindon Cons. ... ... ... | 98—103 | ... |
| 60,425 | June 5 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 103—108 | ... |
| 64,380 | June 19 | 5 | 5 | Torquay & Paignton 5 p.c. Pref. | 102—107 | ... |
| 130,000 | Aug. 21 | 8 | 5 | Wakefield Ord. ... ... ... | 101—106 | ... |
| 81,650 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 81—86 | ... |
| 82,000 | July 31 | 6 | 6 | Weymouth Ord. ... ... | 101—106 | ... |
| 273,626 | Aug. 21 | 7 | 7 | Wolverhampton Cons. Ord. ... | 126—131 | ... |
| 98,384 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... ... | 113—118 | ... |
| 160,000 | June 19 | 5½ | 5½ | Do. 5½ p.c. Red. Deb. ... | 102—107 | ... |
| 106,490 | Aug. 21 | 5½ | 5½ | Wrexham Ord. ... ... ... | 89—94 | ... |
| 90,000 | June 19 | 5 | 5 | York 5 p.c. Red. Deb. ... ... | 102—107 | ... |
| 133,640 | July 31 | 6¼ | 6 | Yorktown (Cam.) 5 p.c. Cons. | 112—117 | ... |
| 120,000 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 100—105 | ... |
| 35,000 | June 19 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 110—115 | ... |

## BRISTOL EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week |
|---|---|---|---|---|---|---|
| 347,756 | July 31 | 6 | 5 | Bath Cons. ... ... ... | 107—112 | ... |
| 1,667,250 | ,, | 5 | 5 | Bristol, 5 p.c. max. ... ... | 97—101 | ... |
| 120,420 | June 5 | 4 | 4 | Do. 1st 4 p.c. Deb. ... ... | 89—93 | ... |
| 415,250 | ,, | 4 | 4 | Do. 2nd 4 p.c. Deb. ... | 89—93 | ... |
| 328,790 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... ... | 104—109 | ... |
| 274,000 | July 31 | 5 | 5 | Newport (Mon.) 5 p.c. max. ... | 90—95 | ... |
| 13,200 | Sept. 4 | 8⅝ | 7 | Pontyp'l Gas & W. 10 p.c. 'A' | 12—13 | ... |
| 13,600 | ,, | 6 | 5 | Do. 7 p.c. 'B' ... ... | 10½—11 | ... |
| 40,000 | ,, | 6 | 5 | Do. 7 p.c. 'C' ... ... | 10½—11 | ... |
| 140,778 | July 31 | 5 | 5 | Weston-super-Mare Cons. ... | 93—98 | -2 |
| 64,338 | June 19 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 90—95 | .. |
| 33,340 | ,, | 7½ | 7½ | Do. 7½ p.c. Deb. ... ... | 140—150 | ... |

## LIVERPOOL EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week |
|---|---|---|---|---|---|---|
| 157,150 | July 31 | 6½ | 5 | Chester 5 p.c. Ord. ... ... | 105—108 | ... |
| 92,500 | June 5 | 4 | 4 | Do. 4 p.c. Pref. ... ... | 85—90 | ... |
| 36,430 | ,, | 3½ | 3½ | Do. 3½ p.c. Deb. ... ... | 86—89 | ... |
| 41,890 | ,, | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 96—100 | ... |
| 2,167,410 | Aug. 21 | 6 | 6 | Liverpool 5 p.c. Ord. ... ... | 110—112 | ... |
| 245,500 | June 19 | 5 | 5 | Do. 5 p.c. Red Pref. ... | 100—105 | ... |
| 306,083 | July 17 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 99—101 | ... |
| 106,280 | July 31 | 10 | 10 | Preston 'A' 10 p.c. ... ... | 174—184 | ... |
| 188,219 | ,, | 7 | 7 | Do. 'B' 7 p.c. ... ... | 126—136 | ... |

## NEWCASTLE EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week |
|---|---|---|---|---|---|---|
| 122,577 | Aug. 21 | 8 | 8 | Blyth 5 p.c. Ord. ... ... | 146½—148½ | ... |
| 732,000 | Aug. 21 | 3 | 4 | Hartlepool G. & W. Cn. & New | 74½—76½ | ... |
| 2,061,315 | July 31 | 5¾ | 5 | Newcastle & Gateshead Con. | 18/—20/-a | ... |
| 682,856 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... ... | 75—85 | ... |
| 776,706 | June 5 | 3½ | 3½ | Do. 3½ p.c. Deb. ... ... | 84—89 | ... |
| 277,285 | April 24 | 5 | 5 | Do. 5 p.c. Deb. '43 ... | 100—105 | ... |
| 332,351 | Aug. 21 | 6 | 6 | Sunderland 6 p.c. max. ... | 110—120 | ... |

## NOTTINGHAM EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week |
|---|---|---|---|---|---|---|
| 542,270 | Aug. 10 | 9 | 6 | Derby Con. ... ... ... | 110—120 | ... |
| 55,000 | June 19 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 100—105 | ... |
| 20,000 | June 19 | 5 | 5 | Long Eaton 5 p.c. Pref. | 9—11 | ... |
| 80,000 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 100—105 | ... |

## SHEFFIELD EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Oct. 13. | Rise or Fall on Week |
|---|---|---|---|---|---|---|
| 10,000 | Aug. 21 | 10 | 10 | Great Grimsby 'A' Ord. ... | 180—190 | ... |
| 6,500 | ,, | 10 | 10 | Do. 'B' Ord. ... | 180—190 | ... |
| 79,000 | ,, | 10 | 10 | Do. 'C' Ord. ... | 175—185 | ... |
| 1,806,339 | Feb. 20 | 6½ | 6½ | Sheffield Cons. ... ... ... | 120—125 | -5 |
| 95,000 | July 3 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 99—101 | ... |

a The quotation is per £1 of Stock.
* Ex. div. ‡ For year.


# PUBLISHERS' NOTICE

## TERMS OF SUBSCRIPTION

United Kingdom & Ireland : Advance Rate, 35/- per annum ; 18/- per half year. Credit Rate : 40/- per annum ; 21/- per half year.
Dominions & Colonies & United States : 35/- per annum, in advance. Other countries in the Postal Union, 40/- per annum, in advance.

**A copy of the "G.J." Calendar and Directory is presented to continuous subscribers.**

## CLASSIFIED ADVERTISEMENTS

Situations Wanted, 6d. a line (minimum 3/-, about 36 words). Situations Vacant, Plant for Sale and Wanted, Contracts, Public Notices, Educational, &c., 9d. a line (minimum 4/6). Financial Notices, 1/- per line. Box Number, 6d. extra.

## WALTER KING, LTD.,

Telephone: Central 2236-7-8. 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Telegrams: Gasking, Fleet, London.

*War Time Address: "Cluny Lodge," Sandown Avenue, Esher, Surrey. Phone: Esher 747*